# PHONOLOGICAL ANALYSIS OF CASUAL JAPANESE SPEECH IN OPTIMALITY THEORY

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# ACKNOWLEDGEMENTS

In January 2001, when I arrived as a three-year contract, teaching-only lecturer in Japanese within the Department of Asian Studies at the University of Canterbury, I was determined to commence Ph.D. studies by mid-year, and one of the first things I needed to do was to obtain permission from the Head of Department. When I addressed this issue to the then HOD, Professor Ken Strongman, his immediate response was: "Now you have it." If it had not been for his permission and encouragement, I might not be where I am now. For this reason, I sincerely thank Professor Strongman.

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When I finally began writing chapters in July 2003, I had only Friday evenings and weekends to concentrate on my studies due to the nature of my contract with the University and the workload I was assigned. Sitting alone for hours in the office when no one else was on the same floor was an extremely lonely experience, and I often felt like going home. Then came a moral supporter; I used to play table tennis on Sunday evenings and one of the people I played with started to ask me: "How many pages (did you write this weekend)?" I hated to say any number less than three as it sounded as if I was not trying hard enough during that weekend, so his weekly 'how many pages?' question really kept my feet on the ground and helped me overcome the loneliness. You do not know how grateful I am to you, Trevor. You promised to treat me to a feast when I completed my thesis. I hope you keep your word! (Or perhaps I am the one who should treat you to a feast?)

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# ABSTRACT

The study of casual speech, along with that of children's language acquisition, dialects and aphasia, can provide data of great significance in identifying marked segments and structures of languages. Yet few attempts have been made to model formally variation between formal and casual speech. Japanese, for instance, displays a variety of contraction processes in casual speech but, as far as I am aware, no one has ever formalised the grammar underlying casual speech in this language. This thesis is an attempt to shed light on this underdeveloped area of study. By closely examining a wide range of phonological processes observed in casual Japanese speech, I aim to formalise its grammar within the framework of Optimality Theory (McCarthy & Prince 1993a, Prince & Smolensky 1993), with particular focus on one of its branches, Correspondence Theory (McCarthy & Prince 1995).

In this thesis, the grammar of casual speech is formalised by means of constraint reranking. To this end, the hierarchy of constraints for formal Japanese speech is first established through the analysis of consonant alternations and the formation of the *te*-form of verbs, which more or less corresponds to the English present participle.

On close examination of casual speech processes, it is found that the shift from formal speech to casual speech merely involves the demotion of two constraints, namely, MAX-V-IO and MAX-C-IO, and that casual speech contraction can mostly be ascribed to the interaction of ONSET, *LAB and *ɾ. The latter two are, therefore, considered to be marked in Japanese. Also found is that only closed-class items are targeted by most of the processes. This clearly indicates that the distinction between open class and closed class is a cornerstone of the formal-casual contrast in Japanese phonology.

# CHAPTER ONE

## INTRODUCTION AND OVERVIEW

### 1.1 INTRODUCTION

There is a cross-linguistic tendency to opt for less marked structures in casual speech. In Japanese, while every segment in an underlying representation is generally realised at the surface level in formal speech,[1] marked segments and marked structures are often systematically avoided in casual speech, as in many languages. The study of casual speech, along with that of children's language acquisition, dialects and aphasia, can provide data of great significance in identifying marked segments and structures of languages. Yet few attempts have been made to model formally variation between formal and casual speech. Japanese, for instance, displays a variety of contraction processes in casual speech and a number of phonologists discuss some of these processes (Bloch 1946a, 1946b, 1950, Martin 1952, 1975, Hasegawa 1979, Vance 1987, Shibatani 1990, and Tsujimura 1996, among others). However, many do not provide any in-depth account of the processes and, as far as I know, no one has formalised the grammar underlying casual speech in Japanese. This thesis is an attempt to shed light on this underdeveloped area of study and, by closely examining a wide range of phonological processes observed in casual Japanese speech, I aim to formalise its grammar within the framework of Optimality Theory (McCarthy & Prince 1993a, Prince & Smolensky 1993; henceforth, OT), with particular focus on one of its branches, Correspondence Theory (McCarthy & Prince 1995).

Zwicky (1972:607) defines casual speech as "in general, fast and stylistically marked as intimate, informal and the like". In Japanese, casual speech is mainly used among family members and close friends and, thus, implies such notions as informality and familiarity but it does not necessarily mean that a faster rate of speech is one of the attributes of casual speech because formal speech can be as fast as casual speech. A shift

[1] Some marked segments and structures are avoided even in formal speech. One such segment in Japanese is the velar glide, which is always deleted when followed by a non-low vowel in the process of concatenation of morphemes, as seen in /kaw+ɯ/ → [kaɯ] 'buy' (/ɯ/: a morpheme used with a verb root to indicate the non-past tense).

from formal speech to casual speech often involves a shift from the use of the polite form to that of the plain form (e.g. /des+ɯ/ → /da/ 'be', /i+mas+ɯ/ → /i+ɾɯ/ 'stay, exist') and, more importantly, contraction of words and phrases (e.g. [keɾeba] → [kʲa] for /keɾeba/ 'if', [teʃimaɯ] → [tʃaɯ] for /te#simaw+ɯ/ 'end up –ing').[2] If there were only one grammar in a language, contraction would never take place and formal-casual variation would never be observed. However, the fact that contraction does take place as the degree of formality shifts from formal to casual suggests that there is need for considering a different grammar for each register of speech. In this thesis, I will first establish a grammar for formal speech and, through accounting for a variety of contraction processes, formalise a casual speech grammar in Japanese by means of constraint reranking.

In addition to contraction, casual Japanese speech displays *vulgarisms* (Matsumura 1951, Maeda 1954, Kawakami 1977, and Jôo 1989, among others; English naming by Vance (1987)) and *the emergence of the marked* (Kawahara 2001). The former is used by men to show 'roughness' and it involves such sound changes as /ai/ → [eː] and /ɯi/ → [iː],[3] while the latter is observed when words, mostly adjectives and adverbs, are uttered in an emphatic manner. In the latter case, marked segments and structures, such as trimoraic syllables and gemination of voiced obstruents and sonorants,[4] are often preferred rather than avoided. Both vulgarisms and emphatic expressions are important parts of the casual speech phonology of Japanese and are, therefore, duly discussed in this thesis.[5]

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[2] See Chapter 4 for detailed discussion on the contraction of these words as well as some others.

[3] In order to differentiate long vowels (monosyllabic) from two identical vowels (disyllabic), I adopt [ː] to indicate the former in this thesis.

[4] Examples include: /sɯgo+i/ → [sɯːg.goi] 'terrific, terrible' and /hoN+toɯ/ → [hoːn.to] 'really' (a period indicates a syllable break); /jaba+i/ → [jabbai] 'risky, unwise', /kaɾa+i/ → [kallai] 'spicy', /kowa+i/ → [kowwai] 'scary, scared' (/i/: a morpheme used with an adjective root to indicate the non-past tense). In Yamato vocabulary, trimoraic syllables are only seen in a few words and gemination of voiced obstruents and sonorants are banned completely. (Yamato vocabulary refers to words of native origin, which consists of 50-60% of all Japanese vocabulary.) For further discussion on emphatic expressions, see Chapter 8, and for Yamato vocabulary and the other three strata of vocabulary (i.e. Sino-Japanese, Mimetic and Foreign), see McCawley (1968:ch.2), Itô & Mester (1995a) and Fukazawa (1998).

[5] Other phonological processes observed in casual Japanese speech include: vowel alternation (e.g. /nasaɾ+ta/ → [nasatta]~[nasɯtta] 'did (HON.)', /sase+ta/ → [saseta]~[saʃita] 'let, made'; /ta/: morpheme indicating the past tense), consonant alternation (e.g. /sabisi+i/ → [sabiʃiː]~[samiʃiː] 'lonely', /samɯ+i/ → [samɯi]~[sabɯi] 'cold') and palatalisation (/kɯsa+i/ → [kɯsai]~[kɯʃai] 'smelly', /saN/ → [saN]~[tʃaN] 'Mr, Mrs, Miss, Ms'). However, I will not pursue these processes in this thesis because they do not display systematic alternation or palatalisation even when the conditions are met. For descriptive analysis of palatalisation, see Hamano (1986).

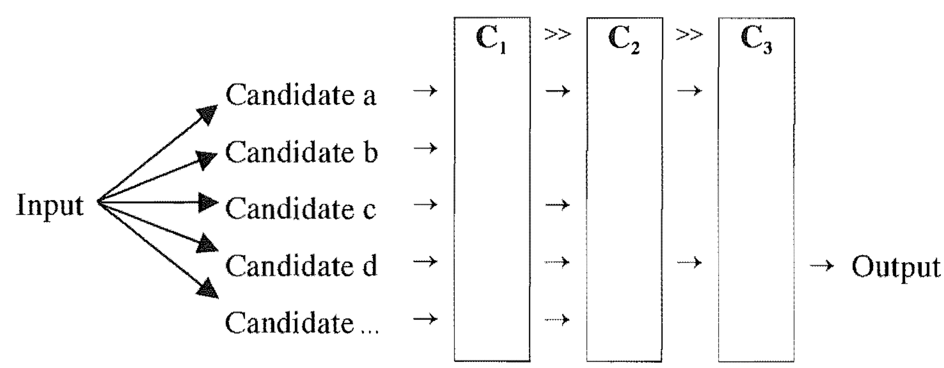
In this thesis, unless otherwise specified, all the examples given in the footnotes and hereafter are from the data collected either in December 1993 and January 1994 for my Master's thesis (1995) or in December 2001 for this thesis.[6]

## 1.2 OPTIMALITY THEORY

It seems appropriate at this stage to briefly sketch the basic architecture of OT before proceeding to any serious data analysis of Japanese. (Readers who are already familiar with OT may skip this section.)

OT is a theory in which grammar is considered to be composed of a set of universal constraints ranked in a language-specific strict-dominance hierarchy. For a given input, the grammar generates a set of output candidates, then the hierarchy of constraints evaluates the candidates and selects one of them that is the most harmonic to the grammar by eliminating those that violate higher-ranking constraints and/or incur more serious violations in comparison with the others until it reaches the point where only one candidate is left.[7] The most harmonic candidate, or the 'optimal' candidate, becomes the actual output and surfaces as the phonetic representation of the input. Kager (1999) schematises this elimination process plainly as follows (**C** is an abbreviation for 'constraint' and >> denotes 'domination'):

(1) Mapping of input to output in OT grammar (Kager 1999:8)




[6] For the sources of data collected in 1993-1994 and the details of the survey in 2001, see Appendix 1 and Appendix 2, respectively.

[7] This candidate may fare worse than others on some lower-ranking constraints but, once a candidate is eliminated, it is completely out of contention and has absolutely no effect thereafter on the selection of the most harmonic candidate.

Candidate comparison is normally made in a 'tableau', in which constraints are set in domination order from left to right. When the relative ranking of two or more constraints cannot be established, they are divided by dotted lines; otherwise a solid line is employed to divide constraints. A violation of a constraint by a candidate is indicated with an asterisk (*), a 'fatal' violation which eliminates a candidate completely, with an exclamation mark (!), and the optimal candidate, with the pointing hand (☞). The cells that require no further consideration for the selection of the optimal candidate are shaded. The schema in (1) thus can be redrawn as follows:

(2) A sample tableau

| Input: /xxx/ | | $C_1$ | $C_2$ | $C_3$ |
|---|---|---|---|---|
| a. | Candidate a | | * | **! |
| b. | Candidate b | *! | | |
| c. | Candidate c | | **! | |
| d. ☞ | Candidate d | | * | * |
| ... | Candidate ... | | **! | * |

Let us take an example from Japanese word-borrowing to see how a tableau works in practice. The English word [kʌmpəs] 'compass' is adopted into Japanese as [kompasɯ], not as [kompas], [kompa], or [komɯpasɯ]. This is due to the interaction of three constraints: **CODACOND**, **DEP-IO** and **MAX-IO**.

(3) Constraints 1

a. **CODACOND(ITION)**: A syllable-final consonant is placeless (Itô 1986, McCarthy & Prince 1986).[8]

b. **DEP(ENDENCE)-IO**: No insertion of segments (McCarthy & Prince 1995).[9]

c. **MAX(IMALITY)-IO**: No deletion of segments (McCarthy & Prince 1995).

The first thing we need to do is to establish the ranking of these constraints, and for this purpose I employ a 'comparative tableau', which is proposed by Prince (2000, 2002). In a

[8] In Japanese the first half of a geminate (e.g. [kit.te] 'stamp'), a nasal homorganic to the following stop or liquid (e.g. [teŋ.ki] 'weather', [dʒin.ɾɯ.i] 'mankind') and a word-final moraic nasal (e.g. [hoN] 'book') are the only licit coda consonants.

[9] 'IO' stands for 'input-output'. Input-output correspondence is one of the domains Correspondence Theory concerns itself with, and it is one of the focal points in this thesis.

comparative tableau, a pairwise comparison is made between the optimal candidate, or the 'winner' (placed on the left side of the wavy line), and its competitor, or the 'loser' (placed on the right side of the wavy line).[10] Constraints are set in random order and W for 'winner' or L for 'loser' is entered to indicate which candidate each constraint prefers. When the constraint does not distinguish the candidates, the cell is left blank.

(4) Comparative tableau for /kʌmpəs/ 'compass' in Japanese[11]

| Input: /kʌmpəs/ | CODACOND | DEP-IO | MAX-IO |
|---|---|---|---|
| a. kompasɯ ~ kompas | W | L | |
| b. kompasɯ ~ kompa | | L | W |
| c. kompasɯ ~ komɯpasɯ | | W | |

In order for the optimal candidate to be the winner, every L must be placed to the right of at least one W in the same row and, in the above case, this can be achieved by reversing the order of DEP-IO and MAX-IO.

(5) Comparative tableau for /kʌmpəs/ 'compass' in Japanese (revised)

| Input: /kʌmpəs/ | CODACOND | MAX-IO | DEP-IO |
|---|---|---|---|
| a. kompasɯ ~ kompas | W | | L |
| b. kompasɯ ~ kompa | | W | L |
| c. kompasɯ ~ komɯpasɯ | | | W |

What Tableau (5) tells us is (i) both CODACOND and MAX-IO must dominate DEP-IO and (ii) DEP-IO is violable but the violation must be minimal. Thus:

(6) Tableau for /kʌmpəs/ 'compass' in Japanese

| Input: /kʌmpəs/ | CODACOND | MAX-IO | DEP-IO |
|---|---|---|---|
| a. ☞ kompasɯ | | | * |
| b. komɯpasɯ | | | **! |
| c. kompa | | *! | |
| d. kompas | *! | | |

[10] Competitors never surface as optimal. Therefore, no comparison is made between losers in a comparative tableau.

[11] I assume here that the input for a loanword is the surface form in its original language in the process of word-borrowing. See Chapter 2, 2.3.1 for further discussion on this.

In OT there are basically two types of constraints: those assessing the well-formedness of output configurations, called *markedness constraints*, and those militating against any deviation from the input, called *faithfulness constraints*. CODACOND is an example of the former, and DEP-IO and MAX-IO are two examples of the latter. Markedness constraints and faithfulness constraints often conflict with each other, and the way of resolving the conflicts differs from one language to another and, I argue, even from one register of speech to another. This is exactly where a 'register-specific' grammar emerges. In this thesis, based on this new concept of 'register-specific', the grammar for formal Japanese speech is established first, then, by means of constraint reranking, an attempt is made to establish its casual speech counterpart.

## 1.3 OPTIMALITY THEORY VERSUS RULE-BASED THEORIES

People often ask,

> Rule-based derivation looks simple and straightforward while OT analysis looks very complicated with a lot of constraints. What is the advantage of OT over rule-based theories anyway?

I believe that there are at least two advantages of OT. Rule-based derivation requires extrinsic rule ordering while OT requires the establishment of constraint ranking. In this respect one cannot argue for superiority of OT. However, OT can supply reasons why a given phonological process applies or fails to apply in a given context, while rule-based theories must often rely on seemingly unmotivated stipulations about the order of rules or restrictions on their applicability.

Let us take another example from Japanese. Shibatani (1990) accounts for the contraction of the auxiliary verb /simaw/ preceded by the *te*-form of a verb 'end up –ing' in casual speech as follows:

(7) Contraction of /mi+te#simaw+ta/ 'ended up watching' in casual speech (Shibatani 1990:177)[12, 13]

| | |
|---|---|
| | 'see up PAST' |
| | mite simaw+ta |
| e → ∅ | mit simawta |
| palatalisation | mitʃimawta |
| C-assimilation | mitʃimatta |
| im → ∅ | mitʃatta |

In the first and last stages of the derivation Shibatani proposes e-deletion and im-deletion, respectively. If Japanese had such rules, every /e/ and /im/ would be completely wiped out before surfacing but, as the following examples show, that is not the case:

(8) Examples against e-deletion and im-deletion[14]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | o+negaw+i | oneŋai | oneŋai / *oŋŋai | 'request, favour' |
| b. | te#okɯre | teokɯre | teokɯre / *tokɯr | 'being too late' |
| c. | te#s+i#koto | teʃiŋoto | teʃiŋoto / *tʃiŋoto | 'handwork' |
| d. | ki#mono | kimono | kimono / *kono | 'kimono' |
| e. | mi+mas+ɯ | mimasɯ | mimasɯ / *masɯ | 'see (POLITE)' |
| f. | simaw+ta | ʃimatta | ʃimatta / *ʃatta | 'put away (PAST)' |

None of the forms with *, except in (8b),[15] violates Japanese phonotactics, which clearly indicates that e-deletion or im-deletion fails to apply in these words for other than phonotactic reasons, and that these two deletion rules, as formalised by Shibatani (1990),

[12] As a matter of fact, I consider /sima/ → /ʃa/ as m-deletion followed by coalescence of /s/ and /i/, which will be discussed in Chapter 4, 4.3. For convenience sake, however, let us adopt Shibatani's analysis here to continue our discussion.
[13] /te/ after /mi/ is a suffix added to a verb root to make the *te*-form of a verb, which roughly corresponds to the English present participle.
[14] In regard to the morphemes:
(i) Affixes: /o/ is added before a noun, a verb or an adjectives to indicate politeness; /i/ is added after a verb root to turn the verb into a noun equivalent; /mas/ is a morpheme indicating politeness, directly or indirectly suffixed to a verb root; /ɯ/ and /ta/ indicate the non-past tense and the past tense, respectively.
(ii) Others: /negaw/, /okɯre/, /s/, /ki/, /mi/ and /simaw/ are full verb roots meaning 'request', 'be delayed', 'do', 'put on, wear', 'see, watch' and 'put away', respectively. /te/, /koto/ and /mono/ are nouns meaning 'hand', '(intangible) thing' and '(tangible) thing', respectively.
[15] This candidate violates CODACOND due to the deletion of the final vowel.

are not general rules of the language. In fact, they only apply to a very limited number of words. How, then, will we know in rule-based theories when rules are applied and when they are not? In OT, on the other hand, this question can be easily answered with the introduction of one simple constraint, **MAX-IO(Open)**.

(9) Constraint 2

**MAX-IO(Open)**: No deletion of segments from open-class items (Kawai 2003a, 2003b).

In all the examples in (8) /e/, /i/, /ɯ/ or /iɯ/ is part of either a noun or a full verb root, that is, an open-class item, and MAX-IO(Open) protects such segments from deletion.[16] By ranking this constraint above the constraint that disallows /e/, /i/ or /ɯ/ (let us tentatively call it $\mathbf{C_x}$), we can make an accurate prediction as to when these segments are deleted and when they are not, as seen in the following tableaux:[17]

(10) Tableaux for /te#simaw+ta/ 'ended up –ing' and /simaw+ta/ 'put away (PAST)' in casual speech

| Input: /te#simaw+ta/ | MAX-IO (Open) | $C_x$ |
|---|---|---|
| a. ☞ tʃatta | | |
| b. teʃimatta | | *! |

| Input: /simaw+ta/ | MAX-IO (Open) | $C_x$ |
|---|---|---|
| c. ʃatta | *! | |
| d. ☞ ʃimatta | | * |

Note that /simaw/ can be used either as an open-class item (i.e. a full verb meaning 'put away') or as a closed-class item (i.e. an auxiliary verb meaning 'end up –ing'), thus, it is sometimes subject to elision, sometimes not.

Constraint ranking in a strict-dominance hierarchy plainly explains, without imposing conditions on individual cases, why some morphemes or words undergo a certain

[16] The deletion of /w/ in (8a) is due to ***wV[-low]** (Kawai 2003a, 2003b), which disallows velar glides before non-low vowels. It is an undominated constraint in Yamato, Sino-Japanese and Mimetic vocabulary. In Foreign vocabulary, however, it is outranked by **FAITH** (Itô, Mester & Padgett 1995) and such examples as [wediŋŋɯ] 'wedding', [wi:biŋŋɯ] 'weaving' and [wo:miŋŋɯappɯ] 'warming up' (all from *Shin Meikai Kokugo Jiten* Fourth Edition (1989)) can be seen.

[17] Other constraints do intervene between MAX-IO(Open) and $C_x$ and, therefore, not every /e/, /i/ or /ɯ/ in closed-class items is deleted in casual speech.

phonological process while others do not and this is a strong advantage of OT over rule-based theories.

Another advantage of OT is that OT brings to light the functional unity of processes, or 'conspiracies' (Kisseberth 1970:295), through a constraint hierarchy, while rule-based theories often miss generalisations by accounting for the processes with different rules. Here are two more examples from Japanese.

(11) Conspiracy in casual speech[18]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | mi#aw+i | miai | mijai | 'marriage meeting' |
| b. | te#i+ɾɯ | teiɾɯ | teɾɯ | 'be –ing' |

Let us account for these two processes through derivation in rule-based theories.

(12) Derivational analyses of /mi#aw+i/ 'marriage meeting' and /te#i+ɾɯ/ 'be –ing'[19]

| | | |
|---|---|---|
| a. | | /mi#aw+i/ |
| | w-deletion | miai |
| | j-insertion | mijai |
| b. | | /te#i+ɾɯ/ |
| | i-deletion | teɾɯ |

It looks as if we were dealing with two separate processes, but on closer inspection we can see that we are actually dealing with just one thing, and that is avoidance of hiatus. In (12a) neither /i/ nor /a/ of /ia/ can be deleted because of high-ranking MAX-IO(Open),[20] so that the only way to avoid hiatus is to insert a segment between the two vowels.[21] In (12b),

[18] /aw/ is a verb root meaning 'match'. /i/ in (11b) is an auxiliary verb root indicating the progressive aspect. /ɾɯ/ is suffixed to a vowel-final verb root to indicate the non-past tense (cf. /ɯ/: suffixed to a consonant-final verb root; see fn.1). The causal form [mijai] (11a) is also heard in fast speech even in formal situations. For further discussion on j-epenthesis between /i/ and /a/, see Maeda (1971:ch.9).

[19] w-deletion in (12a) is due to *wV[-low] (see fn.16).

[20] The reason why [ai] is not avoided is (i) the deletion of /a/ is prohibited by MAX-IO(Open), (ii) the deletion of /i/ incurs a violation of **GRWD>ROOT(Open)** (see Chapter 5, 5.3.1), and (iii) if /w/ is realised as [j] just to get around an onsetless syllable, it will result in a violation of **IDENT-ONSET-IO(place)** (Beckman 1998).

[21] Unlike some other languages, neither /t/ nor /ʔ/ is employed to break up hiatus in Japanese. The inserted segment is either /j/ or /w/, depending on the value for [back] of the first vowel (e.g. /s+i#awase/ →

on the other hand, /te/ is a suffix and /i/ is an auxiliary verb root, both of which are closed-class items, and are not protected by MAX-IO(Open). Therefore, either /e/ or /i/ can be deleted in order to avoid hiatus,[22] and because of its lower sonority /i/ is chosen in this context.[23] In OT, avoidance of hiatus is due to a markedness constraint called **ONSET**.

(13) Constraint 3

**ONSET**: Syllables must have onsets (Itô 1986, 1989)

The following tableaux show how ONSET interacts with the faithfulness constraints that have been introduced up to this point:[24]

(14) Tableaux for /mi#aw+i/ 'marriage meeting' and /te#i+rɯ/ 'be -ing' in casual speech

| Input: /mi#aw+i/ | MAX-IO(Open) | ONSET | MAX-IO | DEP-IO |
|---|---|---|---|---|
| a. ☞ mijai | * | * | * | * |
| b. miai | * | **! | * | |
| c. mai | **! | * | ** | |

| Input: /te#i+rɯ/ | MAX-IO(Open) | ONSET | MAX-IO | DEP-IO |
|---|---|---|---|---|
| d. ☞ terɯ | | | * | |
| e. teirɯ | | *! | | |

What looked like two separate processes, in fact, aim to achieve the same goal: avoidance of onsetless syllables, and the only difference between these processes is the way they achieve the goal. This kind of generalisation becomes crystal-clear in OT analysis but in rule-based theoretical analysis it is easily overlooked. The second advantage of OT is the predictability of generalisations which rule-based theories fail to detect.

In order to account for just one phonological process, rule-based theories may need only a few rules, while OT often requires a number of constraints. This is one of the reasons why people question the superiority of OT to rule-based theories. However, once

[ʃijawase] 'happiness', [gɯ#aw+i] → [gɯwai] 'physical condition'). Note that glide insertion does not take place when the second vowel of a hiatus is not a low vowel.

[22] To avoid hiatus, deletion is preferred in many contexts over insertion due to ***STRUC(σ)** (Zoll 1993b).

[23] For vowel sonority, see Ladefoged (1993:245-246), and for a set of sonority-based anti-vowel constraints (i.e. *i >> *ɯ >> * e >> *o >> *a), see Chapter 3, 3.3 as well as Kawai (2003a).

[24] Tableaux (14) are simplified versions. The constraints briefly mentioned in footnotes, such as *wV[-low] and *STRUC(σ), and other potential candidates are omitted.

the constraint ranking is established, OT can account for many combinations of processes observed in the same register of speech with one simple constraint hierarchy, while rule-based theories may still require a different rule for each process, being unable to identify how the processes conspire to achieve the same goal. It is for this reason that I employ OT to account for a variety of processes Japanese exhibits in casual speech and to eventually formalise the grammar underlying this register of speech.

## 1.4 ORGANISATION OF THE THESIS

The first step we should take in order to formalise casual speech grammar by means of constraint reranking is to establish the hierarchy of constraints for formal speech. Chapter 2, therefore, is devoted to this end. In formal Japanese speech, most underlying segments are realised faithfully at the surface level and only a handful of consonants are subject to phonetic change or deletion. Predecessors, such as Itô & Mester (1995a) and Fukazawa (1998), have proposed a number of constraints and constraint rankings to account for the different behaviours observed in the four-stratum vocabulary of Japanese (i.e. Yamato, Sino-Japanese, Mimetic and Foreign).[25] My main focus in this chapter, however, will be the establishment of the constraint ranking for Yamato vocabulary alone in formal speech, and as a related subject, an attempt will be made to account for the formation of the *te*-form of verbs from the point of view of constraint interaction as well.[26]

Chapter 3 deals with syncope in the *te*-from with auxiliary verbs. When hiatus is created in the process of concatenating the *te*-form with a vowel-initial auxiliary verb, one of the vowels is frequently deleted in casual speech due to the interaction of ONSET and **MAX-V-IO** (no vowel deletion; Kager 1999). In order to account for the choice of vowels to be deleted in this syncope, I will propose a set of sonority-based anti-vowel constraints, to which I refer as the *V subhierarchy.

Featural markedness is the focal point of Chapter 4, in which the roles played by two markedness constraints, namely, ***LAB** (no labials; Smolensky 1993) and ***ɾ** (no flaps;

[25] For general phonology of Japanese outside OT, see Bloch (1946a), Arisaka (1959), McCawley (1968), Mabuchi (1971), Hattori (1979), Shibatani, et al. (1981), Vance (1987), and Okumura (1988), among others.
[26] As far as I know, Lombardi (1998) is the only one who has presented an account of this (but not fully) within the framework of OT.

McCarthy & Prince 1995), in casual speech are elucidated by accounting for the contraction of /te#simaw+ɯ/ → [tʃaɯ] 'end up –ing', /keɾedomo/ → [kedo] 'although' and /keɾeba/ → [k$^j$a] 'if'. All three contraction processes involve flap and/or labial deletion. With the exception of only a few isolated cases, flap deletion and labial deletion are limited to closed-class items but not every flap or labial is deleted from such items. In this chapter I will employ Positional Faithfulness Theory (Beckman 1998) and propose three positional faithfulness constraints to explain why some flaps and labials are protected from deletion.

The concept of floating segments (Hyman 1985), or ghost segments (Zoll 1993a, 1993b, 1994, 1996), plays an important role in Chapter 5. Avoidance of flaps in casual speech manifests itself in two ways: flap deletion and flap nasalisation.[27] When a flap cannot be deleted due to MAX-IO(Open), it systematically surfaces as a nasal in the process of making the negative form of a verb with root-final /ɾ/ (e.g. /wakaɾ+ana+i/ → [wakannai] 'not understand, not know') and a few other forms of a verb with /ɾ+V(+/#)nV/ (e.g. /jaɾ+i#nasa+i/ → [jannasai] 'do!', /haiɾ+ɯ#no/ → [hainno] 'enter?, will enter'). This flap nasalisation raises a question as to why a vowel is deleted from a well-formed syllable in these phrases when [ɾVnV] is perfectly acceptable elsewhere in the language. In this chapter flap nasalisation will be accounted for through the interaction of *ɾ and IDENT-IO(nasal) (McCarthy & Prince 1995) and by invoking Ghost Segmental Theory developed by Zoll.

When contraction involves glide formation (e.g. /keɾeba/ → [k$^j$a] 'if'), the loss of mora count is often compensated for by lengthening the final vowel (e.g. /keɾeba/ → [k$^j$a:] 'if'). Within the framework of OT, compensatory lengthening has been dealt with by Lee (1996), Sprouse (1997), Goldrick (2000) and Kawahara (2001), among others, who all consider that underlying vowels project their own mora, which is on a par with Hayes' (1989) Moraic Phonology. Based on this shared notion, an attempt will be made in Chapter 6 to account for compensatory lengthening in Japanese through the interaction of

[27] Some phonologists (e.g. Hasegawa 1979, Tsujimura 1996) employ the term 'nasal syllabification'. However, I do not think it is appropriate to describe the process as such because the underlying /ɾ/ surfaces as a coda of the preceding syllable and, although it occupies a node on a moraic tier, it does not form a syllable by itself.

two conflicting faithfulness constraints, **PARSE-μ** (moras must be parsed; McCarthy & Prince 1993a) and **WT-IDENT-IO** (no lengthening or shortening of segments; McCarthy 1995). Also in this chapter, we will discuss a number of cases of 'inverse CL' (Hayes 1989) attested in Japanese from the point of view of 'anti-faithfulness' (Horwood 2000, Alderete 2001).

Chapter 7 is dedicated to vowel coalescence and vulgarisms. Vowel coalescence can be observed in normal (i.e. non-vulgar) speech when a sequence of certain vowels occurs within a single morpheme and/or across a morpheme boundary. In vulgarisms, which are mainly used by men to show 'roughness', vowel coalescence is also applied to sequences that never undergo coalescence in normal speech. Vulgarisms thus can be seen as a kind of institutionalised distortion of phonology for affective purposes.[28] In this chapter, we will first discuss contexts in which vowel coalescence takes place and in which it does not, and after establishing the constraint ranking required to account for occurrence and non-occurrence of vowel coalescence in normal speech, I will suggest how vulgarisms can be accounted for by simply adding one 'anti-faithfulness' constraint to the constraint hierarchy.

In emphatic expressions a number of high-ranking constraints, some of which are undominated in Yamato vocabulary, are violated by lengthening segments. The parts of speech that are involved in this process are adjectives and adverbs, with the exception of only a few nouns and verbs, and so it seems that we need to invoke a constraint specific to lexical category in order to differentiate the behaviour of adjectives and adverbs from that of the others. Another aspect of emphatic expressions we must examine is 'gradient well-formedness' (Hayes 2000). While any segment, except for the initial consonant, of an adjective or an adverb can be lengthened[29] and, therefore, a number of emphatic forms are possible for each word, native speakers of Japanese find some variants more natural than others and some utterly unacceptable. It is likely that the sonority of segments to be lengthened and the locus of lengthening conspire to produce 'gradient well-formedness' effects. In Chapter 8, all these will be explored in depth.

[28] This somehow resembles Cockney phonology adopted by RP speakers of English when they wish to sound 'tough'.
[29] When lengthened, an intervocalic /r/ surfaces as [ll]. See Amanuma, et al. (1978:75).

Chapter 9 concludes the thesis. Based on the discussions in Chapters 2-8, two full constraint rankings, one for formal Japanese speech and the other for casual Japanese speech, will be presented. Problems with our OT analysis, as well as some residual issues, will also be discussed in this chapter.

# CHAPTER TWO

## CONSTRAINT RANKING FOR FORMAL SPEECH

### 2.1 INTRODUCTION

In this chapter we will look at what constraints are actively involved and how they interact with each other in formal speech in Japanese. There are two sections in this chapter; the first section, to which I refer as "general phonology", examines verbal paradigms, consonant alternations and sequential voicing; the second section is devoted solely to accounting for the formation of the *te*-form of verbs, which more or less corresponds to the English present participle. The aim of this chapter is to establish the grammar underlying formal Japanese speech.

### 2.2 GENERAL PHONOLOGY

#### 2.2.1 Constraint Interaction in Verbal Paradigms

Let us first look at verbal paradigms to see what constraint interaction is observed in Yamato vocabulary.

(1) Verbal paradigms[1]

| | | Underlying | Surface | Gloss |
|---|---|---|---|---|
| i. /kas/ 'lend' | | | | |
| a. | negative form | kas+ana+i | kasanai | 'not lend' |
| b. | polite form | kas+i+mas+ɯ | kaʃimasɯ | 'lend (POLITE)' |
| c. | dictionary form | kas+ɯ | kasɯ | 'lend' |
| d. | imperative form | kas+e | kase | 'lend!' |
| e. | volitional form | kas+oo[2] | kaso:[3] | 'will lend, let's lend' |

[1] In Japanese there are two irregular verbs [sɯɾɯ] 'do' and [kɯɾɯ] 'come' (both given in the dictionary form, or the non-past plain affirmative form, for convenience sake), and all the other verbs are classified into two groups: those whose root ends in a vowel and those whose root ends in a consonant. The root of the former, or an *1-dan* (pronounced as [itʃidaN]) verb, must end in either /e/ or /i/ and that of the latter, or a *5-dan* (pronounced as [godaN]) verb, must end in /b/, /m/, /w/, /t/, /s/, /n/, /ɾ/, /k/ or /g/. /b/, /m/, /n/, /ɾ/ and /k/ all surface as they are in the forms mentioned in (1) and /g/ is nasalised (see 2.2.3). We will deal with unfaithful realisation of these consonants, except for /n/, later in this chapter.

| ii. /kat/ 'win' | Underlying | Surface | Gloss |
|---|---|---|---|
| a. negative form | kat+ana+i | katanai | 'not win' |
| b. polite form | kat+i+mas+ɯ | katʃimasɯ | 'win (POLITE)' |
| c. dictionary form | kat+ɯ | katsɯ | 'win' |
| d. imperative form | kat+e | kate | 'win!' |
| e. volitional form | kat+oo | kato: | 'will win, let's win' |

| iii. /kaw/ 'buy' | Underlying | Surface | Gloss |
|---|---|---|---|
| a. negative form | kaw+ana+i | kawanai | 'not buy' |
| b. polite form | kaw+i+mas+ɯ | kaimasɯ | 'buy (POLITE)' |
| c. dictionary form | kaw+ɯ | kaɯ | 'buy' |
| d. imperative form | kaw+e | kae | 'buy!' |
| e. volitional form | kaw+oo | kao: | 'will buy, let's buy' |

Let us now take a look at the negative form (or the *nai*-form) of verbs: (1.i.a), (1.ii.a) and (1.iii.a). /ana/ is the negative morpheme used with a consonant-final root verb, or a *5-dan* verb, and /i/ indicates the non-past tense. They are both closed-class items and, in spite of that, no effort is made to avoid an ONSET (Itô 1986, 1989) violation. This is due to the interaction of two **M-PARSE** (McCarthy & Prince 1993a) constraints.[4]

(2) Constraints 4

a. **M-PARSE(neg)**: Negative morphemes must be parsed.

b. **M-PARSE(tense)**: Tense morphemes must be parsed.

NB: The minimal requirement to satisfy these constraints is the parsing of the final vowel. As far as M-PARSE(neg) is concerned, [ana], [na] and the morpheme-final [a] satisfy the constraint but [an] and [n] do not.[5]

Languages vary considerably in regard to which morphosyntactic contrasts are consistently expressed and which are sometimes neutralised. In Japanese, polarity and tense are always

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[2] I consider /oo/, not /oɯ/, as the volitional morpheme because even in very slow speech it is pronounced as [oo].

[3] A cluster of two identical vowels surfaces as a long vowel. See Chapter 7, 7.3 for further discussion on this.

[4] The reason I invoke these M-PARSE constraints rather than MAX-IO is that, although MAX-IO(Open) is a high-ranking constraint as we discussed in Chapter 1, MAX-IO(Closed) is not and, thus, some closed-class items are subject to elision.

[5] The crucial feature of negative morphemes may appear to be the nasality. However, if we consider that the minimal requirement to satisfy M-PARSE(neg) is [n], then we will end up selecting *[kasani] for /kas+ana+i/ 'not lend', for instance, in order to satisfy both M-PARSE(tense) and ONSET.

expressed.[6] I thus consider the above two constraints to be undominated. The following tableau shows the interaction of ONSET with the M-PARSE constraints:

(3) Tableau for /kas+ana+i/ 'not lend'

| Input: /kas+ana+i/ | M-PARSE(neg) | M-PARSE(tense) | ONSET |
|---|---|---|---|
| a. ☞ kasanai | | | * |
| b. kasana | | *! | |
| c. kasani | *! | | |

Next, let us examine the polite form (or the *masu*-form) of verbs. In Japanese, except in Foreign vocabulary,[7] coronal obstruents are always palatalised when followed by /i/, as seen in (1.i.b) and (1.ii.b).[8]

(4) Palatalisation of coronals in Japanese[9]

a. t → tʃ / ___ (+) i
b. d → dʒ / ___ (+) i
c. s → ʃ / ___ (+) i
d. z → dʒ / ___ (+) i [10]

This means that **IDENT-IO(anterior)** is dominated by the constraint that forces coronal obstruents to assimilate their place of articulation to the following vowel. Itô & Mester name this constraint **CVLINKAGE(I)**.[11]

(5) Constraints 5

a. **IDENT-IO(anterior)**: No change in the values for [anterior].

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[6] On condition that a negative or tense morpheme is underlyingly present.
[7] Examples of non-palatalisation in Foreign vocabulary include [ti:ʃatsɯ] 'T-shirt' and [ʃi:di:] 'CD' (*Shin Meikai Kokugo Jiten* Fourth Edition (1989)).
[8] Palatalisation of coronals before front vowels is a cross-linguistically common process, which is observed in such languages as Hausa (McCarthy 1986:231), Karak (Odden 1977:185), Nupe (Hyman 1975:77) and Polish (Booij & Rubach 1984:3).
[9] In fact, /n/ is also palatalised to [ɲ] before /i/ but I transcribe this segment as [n], as has been transcribed by many Japanese phonologists.
[10] According to Amanuma, et al. (1978:69), some speakers realise palatalised /z/ as [ʒ] intervocalically.
[11] In Itô & Mester (1995a) they name the same constraint ***TI**, but I opt for CVLINKAGE(I) in this thesis because its name describes the process more generally than *TI. When referring to palatalisation of coronals, some phonologists (Orgun 1996, for one) employ McCarthy & Prince's (1995) **PAL(ATALISATION)**, but as PAL specifically refers to palatalisation of dorsals in McCarthy & Prince's terminology, I will set aside this constraint for that process.

b. **CVLINKAGE(I)**: Coronal obstruents are palatalised before a high front vowel (Itô & Mester 1995b).

A related process to palatalisation of coronals is affrication of coronal stops. When /t/ and /d/ are followed by /ɯ/, they always surface as [tsɯ] and [dzɯ], respectively, at the expense of an **IDENT-IO(strident)** violation, as seen in (1.ii.c). [12]

(6) Affrication of coronal stops in Japanese[13]

a. t → ts / ___ (+) ɯ
b. d → dz / ___ (+) ɯ

This is due to another constraint proposed by Itô & Mester (1995b), which demands the presence of continuancy (or stridency) in coronal obstruents before a high back vowel.

(7) Constraints 6

a. **IDENT-IO(strident)**: No change in the values for [strident].
b. **CVLINKAGE(*TU)**: Coronal stops are affricated before a high back vowel (Itô & Mester 1995b).[14]

The following tableaux summarise the discussion so far:

(8) Tableaux for /kas+i+mas+ɯ/ 'lend (POLITE)' and /kat+ɯ/ 'win'[15]

| Input: /kas+i+mas+ɯ/ | CVLINKAGE(I) | IDENT-IO(anterior) |
|---|---|---|
| a. ☞ kaʃimasɯ | | * |
| b. kasimasɯ | *! | |

[12] The reason why /t/ before a non-high vowel does not surface as /ts/ or /tʃ/ is that there is no such constraint as CVLINKAGE(*TV[-high]) or, even if there is such a constraint, it is ranked too low to have any effect on the quality of /t/.
[13] Word-initial /z/ and word-medial /z/ directly preceded by /n/ are also often affricated to /dz/ (Jôo 1988:76). When /z/ is geminated, it always surfaces as /ddz/ (see Chapter 8).
[14] Perhaps this constraint can be redefined as "coronal stops are affricated before a high vowel", because palatalisation of coronal stops also involves affrication, as shown in (4a-b).
[15] In accounting for /kat+ɯ/ 'win', Itô & Mester propose CVLINKAGE(*TU) >> NO-AFFRIC >> PARSE-FEAT (or DEP-IO) (1995b:196), though PARSE-FEAT does not play any role in selecting the optimal candidate. My analysis differs from theirs in that I consider the process from the point of view of interaction of a markedness constraint and a faithfulness constraint instead of two conflicting markedness constraints.

| Input: /kat+ɯ/ | CVLINKAGE(*TU) | IDENT-IO(strident) |
|---|---|---|
| c. ☞ katsɯ | | * |
| d. katɯ | *! | |

Palatalisation of coronals and affrication of coronal stops are two examples of Prince & Smolensky's principle, "Do Something Except When Banned" (1993/2002:23), in which a higher-ranked markedness constraint forces a violation of a lower-ranked faithfulness constraint. Although the lower-ranked constraint favours the candidate more faithful to the underlying representation, the higher-ranked constraint forces rejection of the otherwise favoured option.

Let us now move to a case of w-deletion, as seen in (1.iii.b-e). In Japanese, again except in Foreign vocabulary,[16] velar glides are completely disallowed before a non-low vowel due to undominated ***wV[-low]**. A /w/+V[-low] cluster is only created in the process of affixing a vowel-initial suffix to a /w/-final verb root, and a *wV[-low] violation is resolved by deleting the glide at the cost of MAX-IO(Open) (see Chapter 1, (9)) and ONSET violations (e.g. /kaw+ɯ/ → [kaɯ] 'buy').

(9) Constraint 7

***wV[-low]**: No velar glide before a non-low vowel (Kawai 2003a, 2003b).

Apart from a few isolated cases,[17] the only time MAX-IO(Open) is systematically violated is when a /w/-final verb root is followed by a suffix with an initial non-low vowel in order to avoid a *wV[-low] violation. ONSET, on the other hand, is frequently violated not only within open-class items but also across morpheme boundaries, as seen in the following examples:

[16] Examples include: [wi:biŋŋɯ] 'weaving', [wediŋŋɯ] 'wedding' and [wo:miŋŋɯappɯ] 'warming up' (repeated from Chapter 1, fn.16; *Shin Meikai Kokugo Jiten* Fourth Edition (1989)).

[17] Examples include /mono/ → [mon] '(tangible) thing', /tokoro/ → [toko] 'place (n.)', and /kosirae+rɯ/ → [kosaerɯ] 'produce'. I believe that the first two examples are due to frequency effects (/mono/ and /tokoro/ are the 11th and the 50th most frequently used word of all Japanese vocabulary, according to the National Institute of Japanese Language (1962)) and that the third example is due to lexicalisation. See Chapter 4, 4.4 for further discussion.

(10) Examples of ONSET violation[18]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | aida | aida | 'interval' (open-class item) |
| b. | warɯ+i | warɯi | 'bad' (open-class item + suffix) |
| c. | o+ɯti | oɯtʃi | '(your) house' (prefix + open-class item) |
| d. | te#o | teo | 'hand (ACC.)' (open-class item + particle) |
| e. | minami#e | minamie | 'to the south' (open-class item + particle) |

*wV[-low] is never violated while MAX-IO(Open) is violable, as seen in /kaw+ɯ/ → [kaɯ] 'buy' (1.iii.c). In Chapter 1, 1.3 we established MAX-IO(Open) >> ONSET, so these three constraints are ranked in the following order:

(11) Constraint ranking 1

*wV[-low] >> MAX-IO(Open) >> ONSET

Let us confirm that this ranking correctly selects optimal candidates for /kaw+ɯ/ 'buy' (1.iii.c), /aida/ 'interval' (10a) and /warɯ+i/ 'bad' (10b) in tableaux where undominated CODACOND (Itô 1986, McCarthy & Prince 1986) and M-PARSE(tense) are also included.

(12) Tableaux for /kaw+ɯ/ 'buy'[19], /aida/ 'interval'[20] and /warɯ+i/ 'bad'

| Input: /kaw+ɯ/ | CODACOND | M-PARSE(tense) | *wV[-low] | MAX-IO(Open) | ONS |
|---|---|---|---|---|---|
| a. ☞ kaɯ | | | | * | * |
| b. kɯ | | | | **! | |
| c. kawɯ | | | *! | | |
| d. ka | | *! | | * | |
| e. kaw | *! | * | | | |

| Input: /aida/ | CODACOND | M-PARSE(tense) | *wV[-low] | MAX-IO(Open) | ONS |
|---|---|---|---|---|---|
| f. ☞ aida | | | | | ** |
| g. ada | | | | *! | * |
| h. ida | | | | *! | * |

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[18] In (10c-e) non-deletion of the prefix and the particles are due to **ALIGN-L(Open)** or **M-PARSE(Particle)**. See Chapter 3, 3.4 and Chapter 7, 7.2.5, respectively, for discussion on the effects of these constraints.

[19] Another possible but not successful candidate is *[kajɯ], which violates **IDENT-ONSET-IO(place)**. See (17) and fn.29 for this constraint and further discussion.

[20] Non-avoidance of an ONSET violation by the initial /a/ is due to **ANCHOR-IO(Open)** (see Chapter 3, 3.4).

| Input: /warɯ+i/ | CODACOND | M-PARSE(tense) | *wV[-low] | MAX-IO(Open) | ONS |
|---|---|---|---|---|---|
| i. ☞ warɯi | | | | | * |
| j. wari | | | | *! | |
| k. warɯ | | *! | | | |

We have so far examined the interaction of constraints observed in verbal paradigms. Seven constraints have been introduced in this section and three more have been re-introduced. Let us recapitulate those constraints.

(13) Summary of constraints 1

i. Undominated constraints
   a. CODACOND
   b. CVLINKAGE(I)
   c. CVLINKAGE(*TU)
   d. M-PARSE(neg)
   e. M-PARSE(tense)
   f. *wV[-low]

ii. Dominated constraints
   a. IDENT-IO(anterior)
   b. IDENT-IO(strident)
   c. MAX-IO(Open)
   d. ONSET

The ranking of MAX-IO(Open) and ONSET has been determined but the positions of the two IDENT-IO constraints have not in relation to the other two dominated constraints. From the data we have at hand (i.e. verbal paradigms in (1)), however, we are unable to establish the ranking of these four constraints, so I assume for the time being that IDENT-IO(anterior) is ranked in the same stratum as ONSET and IDENT-IO(strident) below ONSET.[21] This yields the following constraint ranking:

(14) Constraint ranking 2

CODACOND, CVLINKAGE(I), CVLINKAGE(*TU), M-PARSE(neg), M-PARSE(tense), *wV[-low]
   >>
MAX-IO(Open)
   >>
IDENT-IO(anterior), ONSET
   >>
IDENT-IO(strident)

[21] This ranking will be confirmed when more data are presented in Chapter 3, 3.3, Chapter 4, 4.5, Chapter 5, 5.3.3 and Chapter 6, 6.4.

### 2.2.2 The *Ha*-Column Consonants[22]

Historically, Japanese did not possess the voiceless glottal fricative /h/. Although there is no written record to indicate the precise values for the consonant of the *ha*-column before the *Nara* period (710-794), Ueda's (1900) view that it was pronounced as [p] and later as [ɸ] seems to be widely accepted nowadays.[23] In the first half of the *Edo* period (1603-1868), the bilabial fricative was replaced with the glottal fricative before a non-high vowel and with the palatal fricative before a high front vowel as part of underpronunciation of labials, but it remained the same before a high back vowel (Okumura 1972:128, Toyama 1972:244, and Tsukishima 1988:97, among others).[24] According to Carr (1993:270), histories in which voiceless stops become voiceless fricatives and then become [h] due to loss of articulatory activity, are cross-linguistically very common,[25] and underpronunciation of labials in Japanese, therefore, is far from an isolated case of this kind of lenition.

The legacy of [h]~[ç]~[ɸ] alternation for the consonant of the *ha*-column is still observed in Modern Japanese, as seen in the following examples:

(15) [h]~[ç]~[ɸ] alternation

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | hido+i | çidoi | 'horrible' |
| b. | heta+na | hetana | 'poor, bad' |
| c. | haja+i | hajai | 'fast, early' |
| d. | hoso+i | hosoi | 'thin, slender' |
| e. | hɯɾɯ+i | ɸɯɾɯi | 'old' |

22 See Appendix 3 for the *ha*-column and the other columns of the Japanese syllabary (or *gojûonzu*).

23 In regard to [p] → [ɸ], Hashimoto (1950:39) cites Ueda's and Andô's view as 'before the beginning of the *Nara* period' and 'from the *Nara* period to the *Heian* period (794-1192)', respectively. Although there is no clear evidence to determine the exact time when this spirantisation took place, it is a well-known fact, thanks to Collado's detailed description in "*Nihon Bunten*" (1632), that around 1600 in Kyoto the *ha*-column consonant was pronounced as [ɸ] (Tsukishima 1988:68).

24 I believe that the reason why the consonant in question ended up being pronounced as [ç] before a high front vowel and as [ɸ] before a high back vowel was because of the close link between the consonant and the vowel: [ç] because of palatality of the high front vowel and [ɸ] because of labiality of the high back vowel. Although the high back vowel is [-round] in Modern Japanese (at least in standard Japanese, or Tokyo dialect), judging from the fact that [ɸ] was not replaced with [h] in the *Edo* period, it is very likely that the high back vowel was [+round] in those days.

25 Lass (1984:179) argues that the majority of /h/ in present-day languages can perhaps be traced back to the lenition of other obstruents, and gives Dravidian, Kannaḍa, and Armenian as examples of languages with /h/ from earlier /p/.

To account for this alternation, I propose the following constraints, in the fashion of Itô & Mester (1995b):

(16) Constraints 8[26]

a. **CVLINKAGE(*HI)**: Glottal fricatives are palatalised before a high front vowel.

b. **CVLINKAGE(*HU)**: Glottal fricatives are labialised before a high back vowel.

These CVLINKAGE constraints are never violated in Yamato vocabulary, thus, considered to be undominated. However, in order to satisfy them, one constraint must be violated and that is **IDENT-ONSET-IO(place)**.[27]

(17) Constraint 9 and constraint ranking 3

a. **IDENT-ONSET-IO(place)**: No change in the place of articulation of an onset (Beckman 1998).[28]

b. CVLINKAGE(*HI), CVLINKAGE(*HU) >> IDENT-ONSET-IO(place)[29]

Let us see how the CVLINKAGE constraints interact with IDENT-ONSET-IO(place) to select optimal candidates for (15a), (15b) and (15e).

[26] Another possible constraint is ***hV[+high]**. However, this does not explain why /h/ is realised differently depending on the backness of the vowel, so it is considered to be less useful than those in (16).

[27] IDENT-ONSET-IO(place) is a positional faithfulness constraint. See Beckman (1998) for in-depth discussion on Positional Faithfulness Theory.

[28] I do not consider that palatalisation of coronal obstruents (e.g. /si/ → [ʃi]) incurs a violation of IDENT-ONSET-IO(place). The only feature that differentiates between /s/ and /ʃ/, for instance, is [anterior] so that the constraint which /si/ → [ʃi] violates is not IDENT-ONSET-IO(place) but IDENT-IO(anterior).

[29] IDENT-ONSET-IO(place) must dominate MAX-IO(Open) so that a *wV[-low] violation is avoided by means of w-deletion instead of changing the place of the glide from velar to palatal, as seen in the following tableau for /kaw+ɯ/ 'buy':

| Input: /kaw+ɯ/ | CODACOND | M-PARSE (tense) | *wV[-low] | IDENT-ONSET-IO (place) | MAX-IO (Open) |
|---|---|---|---|---|---|
| a. ☞ kaɯ | | | | | * |
| b. kajɯ | | | | *! | |
| c. kawɯ | | | *! | | |
| d. kaw | *! | * | | | |

If we assume that /h/ does not have a place node, then neither /h/ → [ç] nor /h/ → [ɸ] will violate IDENT-ONSET-IO(place). In this case, we will need such a constraint as **DEP-ONSET-IO(place)** in order to select [hetana], not [çetana] or [ɸetana], for /heta+na/ 'poor, bad' (see Tableau (18)).

(18) Combined tableau for /hido+i/ 'horrible', /heta+na/ 'poor, bad' and /hɯɾɯ+i/ 'old'

| Input: | | CVLINKAGE (*HI) | CVLINKAGE (*HU) | IDENT-ONSET-IO (place) |
|---|---|---|---|---|
| /hido+i/ | a. hidoi | *! | | |
| | b. ☞ çidoi | | | * |
| | c. ɸidoi | *! | | * |
| /heta+na/ | d. ☞ hetana | | | |
| | e. çetana | | | *! |
| | f. ɸetana | | | *! |
| /hɯɾɯ+i/ | g. hɯɾɯi | | *! | |
| | h. çɯɾɯi | | *! | * |
| | i. ☞ ɸɯɾɯi | | | * |

### 2.2.3 The *Ga*-Column Consonants

In standard Japanese, or Tokyo dialect, the consonant of the *ga*-column surfaces as [g] word-initially and [ŋ] elsewhere, as seen in the following examples:

(19) [g]~[ŋ] alternation[30]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | gɯɯtaɾa | gɯːtaɾa | 'lazybones' |
| b. | agɯɾa | aŋɯɾa | 'sitting cross-legged on the floor' |
| c. | kaNgae | kaŋŋae | 'thought, idea' |

The tendency to alternate [g] and [ŋ] this way, according to Okumura (1972:91), can date back as far as the *Heian* period (794-1192) or possibly earlier. Based on their observation of the process of a child learning to pronounce voiced obstruents, Donegan & Stampe (1979:141) conclude that, due to the smaller air-chamber between the articulator and the glottis, posterior voiced stops are more difficult to articulate than anterior released voiced stops (cf. Vance 1987:111). Yet, as voicing must be maintained to distinguish /g/ from /k/ at the surface level (e.g. /tog+ɯ/ 'sharpen' from /tok+ɯ/ 'solve'; /kag+ɯ/ 'smell' from

[30] It seems that there are not many words with word-initial /g/ or word-medial /Ng/ in Yamato vocabulary, and (19a) and (19c) are two of only a few such words that I can think of. However, there are plenty of such words in Sino-Japanese, Mimetic and Foreign vocabulary, although /g/ is never realised as [ŋ] in Mimetic vocabulary (about which, see McCarthy & Prince 1995:354).

/kak+ɯ/ 'write'), the difficulty in maintaining voicing is alleviated by releasing the airflow through the nasal cavity (cf. McCarthy & Prince 1995:353, Itô & Mester 1997:424). However, as Itô & Mester (1997:421) point out, the alternation is no longer consistently observed among younger generations even in Tokyo, many of whom never seem to nasalise /g/ in any context these days. In this thesis, nonetheless, I consider the intervocalic 'Voiced Velar Nasalisation' (henceforth, VVN) as the norm in standard Japanese.

VVN is the main topic of Itô & Mester (1997), in which they discuss the [g]~[ŋ] alternation in detail within the framework of OT. Their analysis of VVN involves the following:

(20) Constraints 10 and constraint ranking 4 (from Itô & Mester (1997:425))

a. ***[ŋ**: [ŋ] is prohibited word-initially (also proposed by McCarthy & Prince 1995).

b. ***g**: Voiced dorsal obstruents are prohibited (ibid.).

c. **IDENTLS(nasal)**: Lexical-Surface correspondents are identically specified for [nasal]. (This constraint is basically the same as McCarthy & Prince's (1995) **IDENT-IO(nasal)**.)

d. *[ŋ >> *g >> IDENTLS(nasal)

Here are a couple of tableaux Itô & Mester (1997) provide to account for the alternation.

(21) Tableaux for [kaŋi] 'key' and [geta] 'clogs' (Itô & Mester (1997:425-426))[31]

| Input a. /kagi/ (...[-nas] ...)<br>b. /kaŋi/ (...[+nas] ...)<br>c. /kaGi/ (...[0nas] ...) | *[ŋ | *g | IDENTLS(nasal) |
|---|---|---|---|
| kagi (...[-nas] ...) | | *! | a.<br>b. *<br>c. * |
| ☞ kaŋi (...[+nas] ...) | | | a. *<br>b.<br>c. * |

[31] Based on one of the tenets of OT, 'Richness of the Base' (i.e. no constraints hold at the level of underlying forms), three underlying forms are posited in each of the tableaux. In both cases the tableaux clearly indicate that, whichever of the three inputs is chosen, the desired output is selected as optimal through the interaction of *[ŋ and *g.

| Input d. /geta/ ([-nas] ...)<br>e. /ŋeta/ ([+nas] ...)<br>f. /Geta/ ([0nas] ...) | *[ŋ | *g | IDENTLS(nasal) |
|---|---|---|---|
| ☞ geta ([-nas] ...) | | * | a. |
| | | | b. * |
| | | | c. * |
| ŋeta ([+nas] ...) | *! | | a. * |
| | | | b. |
| | | | c. * |

These tableaux correctly select respective optimal candidates from a set of two candidates each. What is missing from the tableaux, however, is other possible candidates, such as *[kadʒi] (*[kadi] violates CVLINKAGE(I)) *[kani] and *[kai] for 'key', and *[deta], *[neta] and *[eta] for 'clogs'. None of these candidates violates *[ŋ nor *g, and if there is such a markedness constraint as *g, we must be able to explain why underlying voiced velar stops never surface as coronals nor are deleted at the surface level. This is where IDENT-ONSET-IO(place) and MAX-IO(Open) come into play. The domination of *g by these faithfulness constraints can ensure that underlying velars surface as velars, as seen in the following revised tableaux of (21): (I assume /g/ as the underlying voiced velar to make the tableaux look simpler. The assumption of /ŋ/ or /G/ will bring about the same results.)[32]

(22) Tableaux for [kaŋi] 'key' and [geta] 'clogs' (revised)

| Input: /kagi/ | *[ŋ | IDENT-ONSET-IO(place) | MAX-IO(Open) | *g | IDENT-IO(nasal) |
|---|---|---|---|---|---|
| a. kagi | | | | *! | |
| b. ☞ kaŋi | | | | | * |
| c. kai | | | *! | | |
| d. kadʒi | | *! | | | |
| e. kani | | *! | | | * |

[32] Deletion of segments from closed-class items is not prohibited by MAX-IO(Open). However, /g/ is in fact never deleted from closed-class items either. This is because (i) almost all the closed-class items containing /g/ have it as their leftmost consonant (e.g. the nominative particle /ga/; auxiliary verb roots /age/ 'do (someone) the favour of –ing' and /gaɾ/ 'show signs of –ing') and it is protected by high-ranking **MAX$_{INIT}$-C-IO** (Kawai 2003a, 2003b), and (ii) the /g/ in a conjunctive particle /nagaɾa/ 'while', which I believe is the only closed-class item with non-leftmost /g/, cannot be deleted due to homophony avoidance (cf. a conjunctive particle /naɾa/ 'if'). See Chapter 4, 4.2.1 and Chapter 5, 5.4 for further discussion.

| Input: /geta/ | *[ŋ | IDENT-ONSET-IO(place) | MAX-IO(Open) | *g | IDENT-IO(nasal) |
|---|---|---|---|---|---|
| f. ☞ geta | | | | * | |
| g. ŋeta | *! | | | | * |
| h. eta | | | *! | | |
| i. deta | | *! | | | |
| j. neta | | *! | | | * |

2.2.4 The *Ra*-Column Consonants

Many believe that Japanese lacks laterals. However, as Amanuma, Ôtsubo and Mizutani observe, quite a large number of native speakers of Japanese use [l] for word-initial /ɾ/ and all use [l] for /ɾ/ that directly follows /n/ (Amanuma, et al. 1978:75-76). In this subsection I will account for this [ɾ]~[l] alternation — an alternation often overlooked even by Japanese phonologists.

In Yamato vocabulary, words with initial /ɾ/ or medial /Nɾ/ are almost non-existent. This is because until the *Nara* period (710-794) /ɾ/ was only used word-medially and the moraic nasal originally did not exist in Japanese; in the *Heian* period (794-1192) and thereafter /ɾ/ started to appear word-initially and the moraic nasal came into use, through the nationalisation of Sino-Japanese vocabulary (Mabuchi 1971:47, Okumura 1972:73, 113, Kishida 1998:53).

Here are some examples of [ɾ]~[l] alternation.

(23) [ɾ]~[l] alternation

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | ɾiNgo | liŋŋo | 'apple' |
| b. | ɾappa | lappa | 'bugle' (from the Dutch 'roeper'?) |
| c. | ɾokuɯɾo | lokuɯɾo | 'lathe, potter's wheel' |
| d. | kaɾada | kaɾada | 'body' |
| e. | haɾɯ | haɾɯ | 'spring (season)' |
| f. | ɾi+ɾoN | liɾoN | 'theory' (/ɾi/: 'logic', /ɾoN/: 'theory') |
| g. | ɾoN+ɾi | lonli | 'logic' (/ɾoN/: 'theory', /ɾi/: 'logic') |

Lateral-rhotic alternation seems to be cross-linguistically common among languages with only one liquid,[33] and here is what van der Hulst (1996) has to say:

> In systems that have no lateral/rhotic contrast, the liquid can often vary from rhotic to lateral depending on contextual factors. (...) In some cases the choice depends on the manner properties of surrounding segments: the rhotic occurs in intervocalic position and the lateral elsewhere. This suggests that rhotics have a weaker constriction than laterals since the environment V_V counts as a weakening or lenition context (1996:345).

This precisely describes the alternation of [ɾ] and [l] in Japanese. In Japanese, this contextual [l]~[ɾ] alternation is almost identical to that of [ŋ] and [g]: [ɾ] word-medially and [l] word-initially. The only difference, however, is that not [ɾ] but [l] must be used after /n/ (see (23g); cf. /oN+gakɯ/ → [oŋŋakɯ] 'music' (/oN/: 'sound', /gakɯ/: 'happy, enjoyable')), which complies with van der Hulst's above statement.

How, then, should we account for the [ɾ]~[l] alternation within the framework of OT? One way of doing this is to assume that the underlying segment for [ɾ] and [l] is /l/, not /ɾ/, as in Korean,[34] and invoke such constraints as ***VlV** and **IDENT-IO(lateral)**.

(24) Constraints 11

a. ***VlV**: No intervocalic laterals.[35]

b. **IDENT-IO(lateral)**: No change in the values for [lateral] (Lee 2003).

---

[33] Maddieson (1984) reports that, in addition to Japanese, Apinaye, !Xũ and perhaps Bribri are among languages with lateral allophones of a flapped r-sound and that Korean, Dan and Zande are among languages with flapped r-sounds as allophones of a lateral phoneme (1984:83). In some languages the choice between [ɾ] and [l] depends on the backness of the following vowel (i.e. [ɾ] before front vowels and [l] before central/back vowels) (ibid.).

Further to Korean, [ɾ] occurs word-initially and intervocalically and [l] occurs elsewhere, and underlying /nl/ surfaces as [ll], thus there is no [nl] cluster in Korean (Martin 1992:28, 30-31, Lagefoged & Maddieson 1996:243, Lee 2003). (It seems that there is no word of Korean origin that starts with underlying /l/ and that only loanwords have word-initial [ɾ].) Therefore, the only difference between Japanese and Korean in terms of [ɾ]~[l] alternation is how word-initial liquid is realised.

[34] Lee (2003) proposes *NON-MORAIC-l >> *ɾ >> *l, IDENT-IO(lateral) in order to account for the [l]~[ɾ] alternation in Korean. However, undominated *NON-MORAIC-l eliminates any actual output with [ll], as the second half is non-moraic, although she regards [ll] as monomoraic. I believe that *NON-MORAIC-l should be replaced with *VlV and *[l.

[35] I consider *VlV to be cross-linguistically motivated to some extent, based on van der Hulst's (1996:345) observation that in some cases the rhotic occurs intervocalically and the lateral elsewhere.

Incidentally, a number of 'no intervocalic C' constraints have been proposed in OT. Examples include *VhV (McCarthy & Prince 1995), *VdV (ibid.), *VkV (Sprouse 1997) and *VwV (Kager 1999).

(25) Tableaux for /li+loN/ 'theory' and /loN+li/ 'logic'[36]

| Input: /li+loN/ | *VlV | IDENT-IO(lateral) |
|---|---|---|
| a. ☞ liɾoN | | * |
| b. ɾiɾoN | | **! |
| c. liloN | *! | |
| d. ɾiloN | *! | * |

| Input: /loN+li/ | *VlV | IDENT-IO(lateral) |
|---|---|---|
| e. ☞ lonli | | |
| f. ɾonli | | *! |
| g. lonɾi | | *! |
| h. ɾonɾi | | *!* |

This seems to work perfectly well, but only if every single native speaker of Japanese uses [l] word-initially, which in fact is not the case. The assumption that the underlying segment is /l/ fails to explain the emergence of word-initial [ɾ] for some speakers. Let us, therefore, assume this time that the underlying segment is /ɾ/, as has been conventionally understood. In order to account for the [ɾ]~[l] alternation with /ɾ/ being the underlying segment, we need a few more constraints in addition to IDENT-IO(lateral). Based on van der Hulst's above statement, I propose the following two constraints:

(26) Constraints 12

a. ***[ɾ**: [ɾ] is prohibited word-initially.[37]

b. ***Nɾ**: [ɾ] is prohibited after a nasal.

*Nɾ is an undominated constraint because it is never violated, while the relative ranking of *[ɾ and IDENT-IO(lateral) varies depending on the speaker; *[ɾ is ranked higher than IDENT-IO(lateral) by those who use [l] word-initially and lower than IDENT-IO(lateral) by those who do not.[38]

---

[36] Intervocalic /l/ cannot be deleted due to MAX-IO(Open).

[37] The word-initial position is known to be one of the strongest positions. If [ɾ] occurs in a lenition context, as van der Hulst (1996) suggests, it will be plausible to assume that it does not occur word-initially.

[38] This analysis will pose a problem if there are speakers who vary between them. Further investigation will be required to deal with this matter.

(27) Constraint ranking 5

a. For those who use [l] word-initially: *Nɾ, *[ɾ >> IDENT-IO(lateral)[39]

b. For those who use [ɾ] word-initially: *Nɾ >> IDENT-IO(lateral) >> *[ɾ

(28) Tableaux for /ɾi+ɾoN/ 'theory' and /ɾoN+ɾi/ 'logic'[40]

a. For those who use [l] word-initially.

| Input: /ɾi+ɾoN/ | *Nɾ | *[ɾ | IDENT-IO(lateral) |
|---|---|---|---|
| a. ☞ liɾoN | | | * |
| b. ɾiɾoN | | *! | |
| c. liloN | | | **! |
| d. ɾiloN | | *! | * |

| Input: /ɾoN+ɾi/ | *Nɾ | *[ɾ | IDENT-IO(lateral) |
|---|---|---|---|
| e. ☞ lonli | | | ** |
| f. ɾonli | | *! | * |
| g. lonɾi | *! | | * |
| h. ɾonɾi | *! | * | |

b. For those who use [ɾ] word-initially.

| Input: /ɾi+ɾoN/ | *Nɾ | IDENT-IO(lateral) | *[ɾ |
|---|---|---|---|
| a. liɾoN | | *! | |
| b. ☞ ɾiɾoN | | | * |
| c. liloN | | *!* | |
| d. ɾiloN | | *! | * |

| Input: /ɾoN+ɾi/ | *Nɾ | IDENT-IO(lateral) | *[ɾ |
|---|---|---|---|
| e. lonli | | **! | |
| f. ☞ ɾonli | | * | * |
| g. lonɾi | *! | * | |
| h. ɾonɾi | *! | | * |

[39] I consider that this is the norm in standard Japanese, and regard *[ɾ as an undominated constraint which is ranked together with *Nɾ.

[40] The fact that /ɾ/ does not surface as [n], [t] or [d] is due to a couple of positional faithfulness constraints **IDENT-ONSET-IO(nasal)** (see Chapter 5, 5.2.1) and **IDENT-ONSET-IO(obstruent)**.

As far as these two words and other open-class items containing /ɾ/ are concerned, neither word-initial /ɾ/ nor word-medial /ɾ/ is deleted due to MAX-IO(Open). See Chapters 4, 4.6 for discussion on ɾ-deletion from closed-class items.

### 2.2.5 Sequential Voicing

Indisputably, Itô and Mester are two of the leading OT researchers in the field of Japanese phonology. They have proposed a number of constraints and developed a variety of theories to formalise the grammar underlying the four-strata vocabulary of Japanese. One of their most notable analyses is that of *Rendaku*, or sequential voicing (Itô, Mester & Padgett 1995, Itô & Mester 1997, 1998, 2003).

Sequential voicing is a process in which the initial voiceless consonant of the second member of a compound word surfaces as voiced when there is no voiced obstruent in the same member.[41] Here are some examples of those that comply with sequential voicing and those that do not.

(29) Sequential voicing (Itô & Mester 1998:25-26)[42]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | natɯ#soɾa | natsɯzoɾa | 'summer sky' |
| b. | otome#kokoɾo | otomeŋokoɾo | 'maiden heart' |
| c. | moɾ+i#soba | moɾisoba | 'soba serving' |
| d. | onna#kotoba | onnakotoba | 'women's speech' |

Itô & Mester (2003) consider that a linking morpheme ℜ, which solely consists of [+voice], acts as a prefix to the second member of a compound word and account for sequential voicing with the following constraints and constraint ranking:

(30) Constraints 13 and constraint ranking 6

a. **NO-D**: No voiced obstruents (Itô & Mester 2003).

---

[41] The blocking of voicing when there is already a voiced obstruent in the second member of a compound is due to Lyman's Law (i.e. at most one voiced obstruent per morpheme). According to Itô & Mester (1998:70), Lyman's Law is named after the first explicit statement of the generalisation in western literature made by Lyman in 1894, but the discovery of the generalisation itself is due to the 17th century linguistic and literary scholar Motoori in his work on the phonology of Old Japanese.

Okumura (1988:264) argues that the voicing is also blocked when the last consonant of the first member of a compound is a voiced obstruent (e.g. /mizɯ#tama/ → [midzɯtama] / *[midzɯdama] 'drop of water, polka dots'). This might have been the case in Classical Japanese but it is doubtful in Modern Japanese because there seem to be more counterexamples (e.g. /mizɯ#hana/ → [midzɯbana] 'running nose'; Itô, Mester & Padgett 1995:573) than those that comply with his theory. See Itô & Mester (1998:ch.4) for further discussion on this.

Voicing is also blocked often when the second member is not a word of Yamato origin (e.g. /ato#kiN/ → [atokiN] (Yamato+Sino-Japanese) 'left-over money'; /jasɯ#hoteɾɯ/ → [jasɯhoteɾɯ] (Yamato+Foreign) 'cheap hotel' (Tsujimura 1996:56-57).

[42] The original references are written in the Hepburnian system. The IPA transcription is by the author.

b. **No-D²$_m$**: No two voiced obstruents per morpheme domain (ibid.).[43]

c. **Realise-M(orpheme)**: Every morpheme in the input has a nonnull phonological exponent in the output (ibid.).

d. No-D²$_m$ >> Realise-M >> No-D

(31) Combined tableau for /natɯ#ℜ+soɾa/ 'summer sky' and /moɾ+i#ℜ+soba/ 'soba serving'

| Input: | | No-D²$_m$ | Realise-M | No-D |
|---|---|---|---|---|
| /natɯ#ℜ+soɾa/ | a. ☞ natsɯzoɾa | | | * |
| | b. natsɯsoɾa | | *! | |
| /moɾ+i#ℜ+soba/ | c. moɾizoba | *! | | ** |
| | d. ☞ moɾisoba | | * | * |

One of Itô & Mester's (1998) arguments is that **Ident-IO(voice)** should be divided into two: **Ident-IO[+voice]** and **Ident-IO[-voice]**.

(32) Constraints 14[44]

a. **Ident-IO(voice)**: No change in the values for [voice] (McCarthy & Prince 1995).

b. **Ident-IO[+voice]**: An output correspondent of a [+voice] input segment must be [+voice] (Itô & Mester 1998).

c. **Ident-IO[-voice]**: An output correspondent of a [-voice] input segment must be [-voice] (Itô & Mester 1998).

In the case of /moɾ+i#ℜ+soba/ 'soba serving', as the second member never surfaces as *[zopa] or *[zoha][45] just to accommodate sequential voicing, Ident-IO[+voice] must dominate Realise-M. On the other hand, the fact that /soɾa/ surfaces as [zoɾa] in /natɯ# ℜ+soɾa/ 'summer sky' indicates that Realise-M must outrank Ident-IO[-voice]. Thus:

[43] No-D² is a self-conjunction of constraints, which is a kind of local conjunction. Under local conjunction, two constraints are conjoined as a single composite constraint which is violated if and only if both of its components are violated within some domain (Kager 1999:392). See Smolensky (1993, 1995) and Itô & Mester (2003:20-32) for local conjunction.

[44] In their 2003 analysis Ident-IO and Ident-IO[+voice] have the specification [-son] (i.e. Ident[voi]/Obs, Ident[+voi]/Obs, respectively). Itô & Mester (2003) replace Ident-IO[+voice] with Agree[voi]&$_{seg}$-Ident[voi] in their final analysis, but let us employ Ident-IO[+voice] here because Ident[+voi]/Obs will play an important role in our analysis of the formation of the *te*-form of verbs later in this chapter.

[45] In Yamato vocabulary, [p] is an allophone of /h/ and it surfaces only when /h/ is geminated. (/h/ can be geminated as [hh] on odd occasions. See Lawrence (1999).)

(33) Constraint ranking 7

IDENT-IO[+voice] >> REALISE-M >> IDENT-IO[-voice]

In regard to the ranking of NO-$D^2_m$ and IDENT-IO[+voice], Itô & Mester argue that the former must dominate the latter by giving the following example:

(34) Tableau for $_w$[mabɯta] (Itô & Mester 1998:50)

| Input: $_w$/mabɯda/ *(hypothetical)* | NO-$D^2_m$ | IDENT-IO[+voice] |
|---|---|---|
| a. $_w$[mabɯda] | *! | |
| b. ☞ $_w$[mabɯta] | | * |

However, the problem with this argument is that they hypothesise the underlying representation with two voiced obstruents. They do not state whether $_w$[mabɯta] is an actual word or a hypothetical word. If [mabɯta] is the actual word meaning 'eyelid', then its etymological underlying representation is /me#hɯta/ (/me/: 'eye', /hɯta/: 'lid'), which is clearly a case of sequential voicing. If [mabɯta] is a hypothetical word, why, then, do we have to assume that its underlying representation is /mabɯda/ instead of /mabɯta/? Lexicon Optimisation (Prince & Smolensky 1993/2002:209) surely prefers /mabɯta/ to /mabɯda/. Also, granting that the underlying representation is /mabɯda/ and that NO-$D^2_m$ dominates IDENT-IO[+voice], why does the output have to be [mabɯta], not *[mapɯda] or *[mahɯda]?[46] Unless all these questions are answered, NO-$D^2_m$ >> IDENT-IO[+voice] cannot be established with this example. While it is correct to point out that Yamato vocabulary generally complies with No-$D^2_m$, we do find such pairs of words as follows:[47]

(35) Examples of pairs of words with and without NO-$D^2_m$ violation[48]

a. /didi/ → [dʒidʒi] 'grandfather, old man'

---

[46] *[mapɯda] may be ruled out by *p (Itô & Mester 1995a) but we still cannot eliminate the possibility of *[mahɯda]. (In Itô & Mester (2003:164) they employ /maguda/ (hypothetical) → [maguta]/[makuda] to show NO-$D^2_m$ >> IDENT-IO[+voice], but this does not provide an answer to the first question raised above.)

[47] Other examples that do not comply with NO-$D^2_m$ include /dobɯ/ → [dobɯ] 'ditch', /dozi/ → [dodʒi] 'blunder' and /gɯzɯ/ → [gɯdzɯ] 'laggard', all of which are of Japanese origin.

[48] These examples are all proper words, not baby talk, and they all have a proper entry in dictionaries. /didi/ (35a) is possibly /zizi/. Both /didi/ and /zizi/ surface as [dʒidʒi] due to undominated CVLINKAGE(I).

| | | | |
|---|---|---|---|
| | /titi/ | → [tʃitʃi] | 'father' |
| b. | /baba/ | → [baba] | 'grandmother, old woman' |
| | /haha/ | → [haha] | 'mother' |

If NO-D$^2_m$ dominated IDENT-IO[+voice], /didi/ would surface as *[dʒitʃi] or *[tʃidʒi], but the fact that it actually does not indicates that NO-D$^2_m$ >> IDENT-IO[+voice] is incorrect. Therefore, I propose the following constraint ranking to account for sequential voicing:

(36) Constraint ranking 8

IDENT-IO[+voice] >> NO-D$^2_m$ >> REALISE-M >> IDENT-IO[-voice], NO-D

Let us apply this ranking to /didi/ 'grandfather, old man'.

(37) Tableau for /didi/ 'grandfather, old man'

| Input: /didi/ | IDENT-IO[+voice] | NO-D$^2_m$ | REALISE-M | IDENT-IO[-voice] | NO-D |
|---|---|---|---|---|---|
| a. ☞ dʒidʒi | | * | | | ** |
| b. dʒitʃi | *! | | | | * |
| c. tʃidʒi | *! | | | | * |

The domination of NO-D$^2_m$ by IDENT-IO[+voice] ensures that underlying voiced obstruents surface as [+voice] regardless of the number of such segments in the underlying representation of a morpheme.

Itô & Mester (1998) argue that NO-D$^2_m$ must dominate IDENT-IO[+voice] but, in fact, whether the former outranks the latter or the latter outranks the former has no impact on the account of sequential voicing, as seen in the following tableaux:

(38) Tableaux for /mori#soba/ 'soba serving' (revised)

| Input: /mor+i# ℜ+soba/ | NO-D$^2_m$ | IDENT-IO[+voice] | REALISE-M | IDENT-IO[-voice] | NO-D |
|---|---|---|---|---|---|
| a. morizoba | *! | | | * | ** |
| b. ☞ morisoba | | | * | | * |
| c. morizopa | | *! | | * | * |
| d. morizoha | | *! | | * | * |

| Input: /moɾ+i# ℜ+soba/ | IDENT-IO[+voice] | NO-$D^2_m$ | REALISE-M | IDENT-IO[-voice] | NO-D |
|---|---|---|---|---|---|
| e. moɾizoba | | *! | | * | ** |
| f. ☞ moɾisoba | | | * | | * |
| g. moɾizopa | *! | | | * | * |
| h. moɾizoha | *! | | | * | * |

However, in order to account for such words as /didi/ → [dʒidʒi] 'grandfather, old man' and /baba/ → [baba] 'grandmother, old woman', we must rank IDENT-IO[+voice] higher than NO-$D^2_m$ (see Tableau (37) above).

### 2.2.6 Summary

In 2.2.1 we have established the following constraint ranking:

(39) Summary of constraint ranking 1

CODACOND, CVLINKAGE(I), CVLINKAGE(*TU), M-PARSE(neg), M-PARSE(tense), *wV[-low]
>>
MAX-IO(Open)
>>
IDENT-IO(anterior), ONSET
>>
IDENT-IO(strident)

In 2.2.2–2.2.5 the following constraints were introduced:

(40) Summary of constraints 2[49]

i. Undominated constraints

a. CVLINKAGE(*HI) d. *Nɾ
b. CVLINKAGE(*HU) e. *[ɾ
c. *[ŋ

[49] Note that (i) *VlV is omitted from this summary because it is not needed to account for the [l]~[ɾ] alternation in Japanese; (ii) IDENT-IO(nasal), instead of IDENTLS(nasal), is adopted here so that it is in line with the other IDENT-IO family constraints; (iii) the reason why IDENT-IO[+voice] is under the dominated constraints is that /w/ and /ɾ/ surface as [t] before /ta/ (a morpheme indicating the past tense) and /te/ (a morpheme attached to a verb root to make the *te*-form, which more or less corresponds to the English present participle) (see 2.3 for further discussion); and (iv) I consider that the use of [l] word-initially is the norm, thus *[ɾ is undominated.

ii. Dominated constraints

a. IDENT-IO(lateral)
b. IDENT-IO(nasal)
c. IDENT-IO(voice)
d. IDENT-IO[+voice]
e. IDENT-IO[-voice]
f. IDENT-ONSET-IO(place)
g. REALISE-M
h. NO-D
i. NO-$D^2_m$
j *g

Among the dominated constraints, we have so far established the following rankings:

(41) Summary of constraint ranking 2

a. IDENT-ONSET-IO(place) >> MAX-IO(Open) >> *g >> IDENT-IO(nasal) ·· (22)

b. IDENT-IO[+voice] >> NO-$D^2_m$ >> REALISE-M >> IDENT-IO[-voice], NO-D ·· (36)

From (27a) (i.e. *Nɾ, *[ɾ >> IDENT-IO(lateral)), (39) and (41), we can yield the following constraint ranking:

(42) Constraint ranking 9

CODACOND, CVLINKAGE(*HI), CVLINKAGE(*HU), CVLINKAGE(I), CVLINKAGE(*TU), M-PARSE(neg), M-PARSE(tense), *[ŋ, *Nɾ, *[ɾ, *wV[-low]
>>
IDENT-ONSET-IO(place)
>>
IDENT-IO(lateral), IDENT-IO[+voice], MAX-IO(Open)
>>
IDENT-IO(anterior), ONSET, NO-$D^2_m$, *g
>>
IDENT-IO(nasal), IDENT-IO(strident), REALISE-M[50]
>>
IDENT-IO(voice), NO-D

Note that IDENT-IO[-voice] has been replaced with IDENT-IO(voice). This is because (i) the former is more specific than the latter and should outrank the latter, but it is such a low-ranking constraint that, according to the tenet of Occam's razor, there is no point in keeping it in addition to the more general IDENT-IO(voice); and (ii) IDENT-IO(voice) will be needed later in the following section.

[50] REALISE-M is violated rather freely in order for *STRUC to be better satisfied in casual speech (e.g. /te#i+ɾɯ/ → [teɾɯ] 'be –ing' (/i/: auxiliary verb; see Chapter 3), /ik+i#kata/ → [ikkata] 'way of living' (/i/: suffix; see Chapter 4 (21)). The position of this constraint will be revised later in this chapter.

## 2.3 *TE*-FORM PHONOLOGY

When consonant-final root verbs are suffixed with /te/ (a morpheme attached to a verb root to form the *te*-form, which is more or less equivalent to the English present participle), they exhibit a number of processes not observed anywhere else in the language.[51]

(43) *Te*-form of consonant-final root verbs[52]

i. /b/, /m/ or /n/ + /te/ → [nde]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | tob+te | tonde | 'flying, jumping' |
| b. | kam+te | kande | 'biting' |
| c. | sin+te | ʃinde | 'dying' |

ii. /ɾ/, /t/ or /w/ + /te/ → [tte]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | kaɾ+te | katte | 'mowing, cutting' |
| b. | kat+te | katte | 'winning' |
| c. | kaw+te[53] | katte | 'buying' |

iii /s/ + /te/ → [ʃite]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | kas+te | kaʃite | 'lending' |

iv. /g/ + /te/ → [ide] & /k/ + /te/ → [ite]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | kag+te | kaide | 'smelling' |
| b. | kak+te | kaite | 'writing' |

In this section we will closely look into the formation of the *te*-form of consonant-final verbs and establish its grammar by means of constraint interaction.

### 2.3.1 /b/, /m/ or /n/ + /te/ → [nde]

In Japanese, CODACOND is an undominated constraint and the only consonants that can directly precede [t] without violating CODACOND are [t] and [n]. In Yamato vocabulary, however, [nt] is not permissible due to undominated *NC̥ (a.k.a. **POSTNASALVOICING**).

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[51] This is because /te/ is one of only two consonant-initial suffixes that are directly attached to consonant-final root verbs. The other suffix is /ta/, which indicates the past tense, and it also induces the same processes.
[52] As explained in Chapter 2, fn.1, there are nine consonants that can be used verb-root-finally.
[53] I do not agree with McCawley (1968:94) and Vance (1987:190) who claim /kap+te/ → [katte] 'buying'.

(44) Constraint 15

***NC̥**: No nasal-voiceless obstruent sequences (Pater 1999).

Because of *NC̥, a voiceless consonant directly preceded by a nasal must be voiced at the expense of an IDENT-IO(voice)[54] violation.[55] Hence, /sin+te/ → [ʃinde] 'dying' (43.i.c).

(45) Tableau for /sin+te/ 'dying'[56]

| Input: /sin+te/ | CV LINKAGE(I) | *NC̥ | MAX-IO (Open) | IDENT-IO (anterior) | IDENT-IO (voice) |
|---|---|---|---|---|---|
| a. ☞ ʃinde | | | | * | * |
| b. ʃite | | | *! | * | |
| c. ʃinte | | *! | | * | |
| d. sinde | *! | | | | * |

Next, let us examine /kam+te/ → [kande] 'biting' (43.i.b), in which the interaction of CODACOND and *NC̥ is observed. In order to satisfy both CODACOND and *NC̥, /kam+te/ could alternatively surface as *[kamme], *[kambe], *[kabbe], *[kappe], *[kanne], *[kadde], *[katte] or *[kamite], but the actual output is [kande]. What constraint rules out all the other competitors? There is another undominated constraint in Yamato vocabulary, as well as in Sino-Japanese and Mimetic vocabulary, and that is **NOVOIGEM**.[57]

(46) Constraint 16

**NOVOIGEM**: No voiced geminates except nasals (Itô & Mester 1995b).[58]

[54] Lombardi (1998) employs DEP(voice) instead of IDENT-IO(voice) in her analysis of /sin+ta/ → [ʃinda], but whichever constraint is employed, the same results will be obtained. I employ IDENT-IO(voice) in this thesis, as its position in the constraint ranking has already been established. For an account of this process from the point of view of licensing and underspecification, see Itô, Mester & Padgett (1995:601).

[55] In the other three strata of vocabulary, *NC̥ is freely violated, as seen in [taŋka] '*tanka*' (Sino-Japanese), [kaŋkaN] 'in hot anger' (Mimetic) and [iŋki] 'ink' (Foreign).

[56] *[ʃine] is another possible but not successful candidate because the deletion of /t/ incurs a violation of undominated **MAX-IO[+obs][cor]** (see 2.3.3 of this chapter) as well as high-ranking **MAX$_{\text{INIT}}$-C-IO** (see Chapter 4, 4.2.1) and **MAX-C-IO** (see 2.4 of this chapter).

[57] This constraint is violable in Foreign vocabulary (e.g. [mobbɯ] 'mob', [beddo] 'bed', [baggɯ] 'bag'; Itô & Mester 1998:22). [bb], however, seems to be less acceptable and [mobbɯ] is the only example with [bb] that I can think of.

[58] My definition of NOVOIGEM is different from that of Itô & Mester's. In Japanese, gemination of liquids and glides is prohibited as well, at least in formal speech. Hence, it should be incorporated into the constraint.

In the formation of the *te*-form in (43), /te/ is always realised either as [te] or as [de], and unless forced by undominated CVLINKAGE family constraints, the place of an onset consonant is never altered across all four strata of vocabulary. This is due to the previously introduced positional faithfulness constraint, IDENT-ONSET-IO(place).[59]

These two constraints can eliminate all the competitors but *[kanne], *[katte] and *[kamite]. The first two incur a violation of IDENT-IO(nasal) as well as that of **IDENT-IO(place)**, IDENT-IO[+voice] and/or IDENT-IO(voice), while the actual output [kande] only violates IDENT-IO(place) and IDENT-IO(voice).

(47) Constraint 17

**IDENT-IO(place)**: No change in the place of articulation (Kager 1999).

*[kanne] and *[katte], therefore, can never beat [kande]. The insertion of a vowel, on the other hand, seems to be a less costly violation than a violation of both IDENT-IO(place) and IDENT-IO(voice), because DEP-IO is a low-ranking constraint in Japanese, as we saw in Chapter 1, 1.2. However, there is a difference between i-insertion in /kam+te/ and the cases we dealt with in Chapter 1 (i.e. ɯ-insertion in the process of word-borrowing, and glide insertion to avoid hiatus). In word-borrowing, once a loanword is adopted in the Japanese way, the form with an epenthetic vowel (or epenthetic vowels) becomes the new underlying representation (e.g. /kʌmpəs/ → /koNpasɯ/ → [kompasɯ] 'compass'), thus /ɯ/ is not considered to be epenthesised and a DEP-IO violation is not incurred. In the case of hiatus avoidance, glide insertion does incur a DEP-IO violation, but it never incurs a violation of the following constraint:

(48) Constraint 18

**DEP-V-IO**: No insertion of vowels.

Vowel insertion is extremely uncommon in Japanese. Although DEP-V-IO is violable, as seen in (43.iii.a), it is a very high-ranking constraint and vowel insertion is never invoked

[59] Lombardi (1998) proposes MAX-ONSET(place) instead. In Japanese, however, an onset consonant never becomes placeless, so that the use of MAX to refer to the place of articulation of an onset consonant seems inappropriate. For this reason, I opt for IDENT-ONSET-IO(place).

when there are other measures to be taken. Therefore, I consider that DEP-V-IO is only outranked by undominated constraints. For *[kamite], a violation of DEP-V-IO alone is serious enough to lose the contention. As for the ranking of IDENT-IO(place), being a more general constraint than IDENT-ONSET-IO(place), I assume that it is ranked immediately below its more specific counterpart.

Thus, so far we have established the following constraint ranking for the formation of the *te*-form:

(49) Constraint ranking 10

CODACOND, CVLINKAGE(I), *NÇ̥, NOVOIGEM
>>
DEP-V-IO, IDENT-ONSET-IO(place)
>>
IDENT-IO(place), IDENT-IO[+voice], MAX-IO(Open)
>>
IDENT-IO(anterior)
>>
IDENT-IO(nasal)
>>
DEP-IO,[60] IDENT-IO(voice)

Let us see how this constraint ranking evaluates a variety of candidates for /kam+te/ 'biting'. (From now on, constraints that none of the candidates violates and those that all the candidates violate equally are omitted from the tableaux in this chapter, together with some low-ranking constraints that do not play any role in the selection of the optimal candidate.)[61]

[60] I assume that DEP-IO is ranked quite low in the constraint hierarchy, based on the discussion in Chapter 1, 1.2.

[61] Also omitted from the tableaux in 2.3 are candidates without the root-final consonant (e,g. *[kate] > /kam+te/ 'biting') due to a violation of MAX-IO(Open) as well as that of MAX-C-IO and candidates without /t/ (e.g *[kame] > /kam+te/ 'biting') due to MAX-IO[+obs][cor], $\text{MAX}_{\text{INIT}}$-C-IO and MAX-C-IO violations.

(50) Tableau for /kam+te/ 'biting'

| Input: /kam+te/ | CODA COND | *NC̥ | NVG | ID-ONS (place) | DEP-V | ID (pl) | ID [+voi] | ID (nas) | ID (voi) |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ kande | | | | | | * | | | * |
| b. kanne | | | | | | * | | *! | * |
| c. katte | | | | | | * | *! | * | * |
| d. kamite | | | | | *! | | | | |
| e. kambe | | | | *! | | * | | | * |
| f. kamme | | | | *! | | * | | * | * |
| g. kappe | | | | *! | | * | * | * | * |
| h. kadde | | | *! | | | * | | * | * |
| i. kabbe | | | *! | * | | * | | * | * |
| j. kante | | *! | | | | * | | | |
| k. kamde | *! | | | | | | | | * |
| l. kamte | *! | * | | | | | | | |

The actual output [kande] (50a) violates IDENT-IO(place) and IDENT-IO(voice), forced by undominated CODACOND and *NC̥, respectively, but as it satisfies all the high-ranking constraints, it is correctly selected as optimal for /kam+te/ 'biting'.

Next, let us bring /tob+te/ → [tonde] 'flying, jumping' to the test.

(51) Tableau for /tob+te/ 'flying, jumping'

| Input: /tob+te/ | CODA COND | *NC̥ | NVG | ID-ONS (pl) | DEP -V | ID (pl) | ID [+voi] | ID (nas) | ID (voi) |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ tonde | | | | | | * | | * | * |
| b. tonne | | | | | | * | | **! | * |
| c. totte | | | | | | * | *! | | * |
| d. tobite | | | | | *! | | | | |
| e. tombe | | | | *! | | * | | * | * |
| f. tomme | | | | *! | | * | | ** | * |
| g. toppe | | | | *! | | * | * | | * |
| h. todde | | | *! | | | * | | | * |
| i. tobbe | | | *! | * | | * | | | * |
| j. tonte | | *! | | | | * | | * | |
| k. tomde | *! | | | | | | | * | * |
| l. tobte | *! | | | | | | | | |

In this tableau, the domination of IDENT-IO(place) and IDENT-IO(nasal) by CODACOND and by DEP-V-IO rejects the most faithful candidate *[tobte] (51l) and the second most faithful candidate *[tobite] (51d), respectively, and [tonde] (51a), a somewhat deviated form from the underlying representation, is duly selected as optimal.

So far, the constraint ranking proposed in (49) seems to be able to precisely account for the formation of the *te*-form. Let us see how this constraint ranking performs with the *te*-form of the other consonant-final root verbs.

### 2.3.2 /ɾ/, /t/ or /w/ + /te/ → [tte]

The *te*-form of /t/-final root verbs does not pose any problem, as the most faithful candidate surfaces as the actual output, as seen in /kat+te/ → [katte] 'winning' (43.ii.b). However, when the root-final consonant is neither an obstruent nor a nasal (i.e. /ɾ/ or /w/), it surfaces as [t] to form a geminate with the initial consonant of /te/, as seen in /kaɾ+te/ → [katte] 'mowing, cutting' (43.ii.a) and /kaw+te/ → [katte] 'buying' (43.ii.c). First, let us see if the constraint ranking in (49) can correctly select [katte] as the optimal candidate for /kaɾ+te/.

(52) Tableau for /kaɾ+te/ 'mowing, cutting'[62]

| Input: /kaɾ+te/ | CODACOND | *NÇ̥ | DEP-V | ID[+voi] | ID(nas) | ID(voi) |
|---|---|---|---|---|---|---|
| a. katte | | | | *! | | * |
| b. ☹ kande | | | | | * | * |
| c. kanne | | | | | **! | * |
| d. kaɾite | | | *! | | | |
| e. kante | | *! | | | * | |
| f. kaɾte | *! | | | | | |

In this tableau, the actual output [katte] is incorrectly eliminated by IDENT-IO[+voice] and *[kande] is selected as optimal. The problem with this tableau is IDENT-IO[+voice] and so this constraint needs to be modified or replaced with another constraint. In 2.2.5, we saw that, in the process of sequential voicing, voicing of the initial voiceless consonant of the second member is blocked only when there is already a voiced obstruent in the same

[62] *[kalle] is another possible but not successful candidate due to a violation of undominated NOVOIGEM.

member (see (29c-d)). This means that the voicing status of the other segments, such as nasals, liquids and glides, is disregarded in the process (e.g. /natɯ#ℜ+sora/ → [natsɯzora] 'summer sky' (29a)).[63] This fact strongly supports Pater's (1999) claim about non-equivalency of sonorant and obstruent [voice].[64] Therefore, along the same line as Pater's (1999) IDENT-IO(ObsVoice), I propose the following constraint to replace IDENT-IO [+voice]:

(53) Constraint 19

**IDENT-IO[+ObsVoice]**: An output correspondent obstruent of a [+voice] input obstruent must be [+voice].[65]

It must be noted that, when an output correspondent of a [+voice] input obstruent is not an obstruent, IDENT-IO[+ObsVoice] is not violated, just as Pater's IDENT-IO(ObsVoice) is not violated when an output correspondent of an input obstruent is not an obstruent.

Let us see what will happen to Tableau (52) when IDENT-IO[+voice] is replaced with IDENT-IO[+ObsVoice].

(54) Tableau for /kaɾ+te/ 'mowing, cutting' (revised)[66]

| Input: /kaɾ+te/ | CODACOND | *NC̥ | DEP-V | ID[+ObsVoi] | ID(nas) | ID(voi) |
|---|---|---|---|---|---|---|
| a. ☞ katte | | | | | | * |
| b. kande | | | | | *! | * |
| c. kanne | | | | | *!* | * |
| d. kaɾite | | | *! | | | |
| e. kante | | *! | | | * | |
| f. kaɾte | *! | | | | | |

[63] Russian voicing assimilation is another example in which the phonetic voicing of sonorants is ignored. See Kiparsky (1985:104).

[64] Steriade (1995) also argues that sonorant [voice] is originally left out of lexical entries and that it is inserted by redundancy rules while obstruent [voice] is lexically specified.

[65] Itô & Mester (2003) propose basically the same constraint, called IDENT[+VOI]/OBS, as my proposal. MAX-IO[+ObsVoi], the kind of constraint that Lombardi (1998) proposes to account for the *te*-form of /b/-final root verbs, does not work because, if it were a high-ranking constraint, [kaŋi] for /kagi/ 'key' would never be selected as optimal even though *g dominates IDENT-IO(nasal), and VVN (voiced velar nasalisation) would never be observed in Japanese.

[66] The optimal candidate violates **IDENT-IO(obstruent)**. I assume that IDENT-IO(obstruent) is a low-ranking constraint.

There is no [+voice] obstruent in the underlying representation of this word so IDENT-IO [+ObsVoice] has no role to play in this tableau, and [katte] is correctly selected as optimal.

The next task is to see if the same constraint ranking can select [katte] as optimal for /kaw+te/ 'buying' as well. Here is a tableau for /kaw+te/ 'buying'.

(55) Tableau for /kaw+te/ 'buying'[67]

| Input: /kaw+te/ | CODA COND | *NC̥ | *wV [-low] | DEP -V | ID (pl) | ID [+ObsVoi] | ID (nas) | ID (voi) |
|---|---|---|---|---|---|---|---|---|
| a. ☞ katte | | | | | * | | | * |
| b. kande | | | | | * | | *! | * |
| c. kanne | | | | | * | | *!* | * |
| d. kawite | | | *! | * | | | | |
| e. kante | | *! | | | * | | | |
| f. kawte | *! | | | | | | | |

As (54) and (55) clearly show, when the root-final consonant is not a voiced obstruent, IDENT-IO[+ObsVoice] has no influence on the configuration of the actual output. However, it does have some effects in /tob+te/ → [tonde] 'flying, jumping', so Tableau (51) needs to be reconsidered. Also, in Tableau (50) we eliminated *[katte] for /kam+te/ 'biting' due to a violation of IDENT-IO[+voice], which has now been replaced with IDENT-IO[+ObsVoice], thus Tableau (50) needs redrawing as well, so here they are. (Candidates that violate undominated constraints are omitted from the following two tableaux.)

(56) Tableaux for /tob+te/ 'flying, jumping' and /kam+te/ 'biting' (revised)

| Input: /tob+te/ | ID-ONS(pl) | DEP-V | ID(pl) | ID[+ObsVoi] | ID(nas) | ID(voi) |
|---|---|---|---|---|---|---|
| a. ☞ tonde | | | * | | * | * |
| b. tonne | | | * | | **! | * |
| c. totte | | | * | *! | | * |
| d. tobite | | *! | | | | |
| e. tombe | *! | | * | | * | * |
| f. tomme | *! | | * | | ** | * |
| g. toppe | *! | | * | * | | * |

[67] The optimal candidate violates **IDENT-IO(cons)** and **IDENT-IO(cont)** as well as IDENT-IO(obs). I assume that these are also low-ranking constraints.

| Input:/kam+te/ | ID-ONS(pl) | DEP-V | ID(pl) | ID[+ObsVoi] | ID(nas) | ID(voi) |
|---|---|---|---|---|---|---|
| h. ☞ kande | | | * | | | * |
| i. kanne | | | * | | *! | * |
| j. katte | | | * | | *! | * |
| k. kamite | | *! | | | | |
| l. kambe | *! | | * | | | * |
| m. kamme | *! | | * | | * | * |
| n. kappe | *! | | * | | * | * |

After replacing IDENT-IO[+voice] with IDENT-IO[+ObsVoice], we can still obtain the same results for /tob+te/ 'flying, jumping' and /kam+te/ 'biting'. Thus, the constraint ranking in (49) should now be replaced with the following:

(57) Constraint ranking 11

CODACOND, CVLINKAGE(I), *NC̥, NOVOIGEM, *wV[-low]
>>
DEP-V-IO, IDENT-ONSET-IO(place)
>>
IDENT-IO(place), IDENT-IO[+ObsVoice], MAX-IO(Open)
>>
IDENT-IO(anterior)
>>
IDENT-IO(nasal)
>>
DEP-IO, IDENT-IO(voice)

### 2.3.3 /s/ + /t/ → [ʃite]

In this process, a high front vowel is inserted, rather than /s/ becoming [t], to avoid a CODA COND violation. This is a clear case of a DEP-V-IO violation and, due to this serious violation, the actual output [kaʃite] for /kas+te/ 'lending', for instance, is not only beaten by *[kasse] and *[katte] but also by *[kase] and *[kate], as seen in the following tableau:[68]

[68] Lombardi (1998:13) argues that MAX-IO[+strident] >> DEP-IO is needed to account for the process in question, with which I utterly agree, but this ranking is far from sufficient to eliminate such a candidate as *[kasse], thus it needs further consideration. (See (61-62).)

(58) Tableau for /kas+te/ 'lending'

| Input: /kas+te/ | CODACOND | CVLINKAGE | DEP-V | MAX(Open) | IDENT(anterior) |
|---|---|---|---|---|---|
| a. kaʃite | | | *! | | * |
| b. ☹ katte | | | | | |
| c. ☹ kasse | | | | | |
| d. ☹ kase[69] | | | | | |
| e. kate | | | | *! | |
| f. kasite | | *! | * | | |
| g. kaste | *! | | | | |

In Japanese, alternations between stops and affricates (e.g. [t]~[tʃ]~[ts] in the *ta*-column; see Appendix 3), between fricatives and affricates (e.g. [z]~[dʒ]~[dz] in the *za*-column; ibid.), and between stops and nasals (e.g. [b]~[n]; see (43.i.a)) are frequently attested, but those between stops and fricatives are not,[70] with the exception of [h]~[p]~[b].[71] Non-alternation between coronal stops and coronal fricatives is also demonstrated in the process of making compound verbs. When a /ɾ/- or /w/-final root verb is followed by /i/ and another verb with initial /t/, gemination in conjunction with vowel deletion is observed in a number of words, such as the following, in casual speech.

(59) Compound verbs 1

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | haɾ+i#taos+ɯ | haɾitaosɯ | hattaosɯ | 'knock down' |
| b. | toɾ+i#tɯke+ɾɯ | toɾitsɯkeɾɯ | tottsɯkeɾɯ | 'install' |
| c. | ow+i#tate+ɾɯ | oitateɾɯ | ottateɾɯ | 'drive away' |
| d. | ow+i#tɯk+ɯ | oitsɯkɯ | ottsɯkɯ | 'catch up' |

---

[69] This candidate can be eliminated by $\text{MAX}_{\text{INIT}}$-C-IO (see Chapter 4, 4.2.1), which is ranked in the same stratum as MAX-IO(Open).

[70] It is reported that intervocalic /b/ can be spirantised to [β] in careless speech, as seen in /abɯna+i/ → [aβɯnai] 'dangerous' and /sibaɾakɯ/ → [ʃiβaɾakɯ] 'for some time' (Hattori 1951:81, Amanuma, et al. 1978: 65-66, Jôo 1988:75). However, intervocalic weakening like this is not a common process in Japanese, and coronal stops and coronal fricatives never alternate in Yamato vocabulary.

[71] This alternation can be seen in such classifiers as /hai/ 'cupful': /iti+hai/ → [ippai] 'one cupful' /ni+hai/ → [nihai] 'two cupfuls', /saN+hai/ → [sambai] 'three cupfuls' (cf. /h/ → [w]~[b]~[p]; McCawley 1968:82), as well as in emphatic expressions, such as /jahaɾi/ → [jappaɾi] 'as expected', in casual speech. (See Chapter 8 for the latter.)

The surface forms in casual speech in (59) display the same outcome as that of the *te*-form of /ɾ/- or /w/- final root verbs, but when a /s/-final root verb is combined with a /t/-initial verb, the reduction never takes place.

(60) Compound verbs 2

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | nas+i#toge+ɾɯ | naʃitoŋeɾɯ | naʃitoŋeɾɯ | 'achieve' |
| b. | mes+i#toɾ+ɯ | meʃitoɾɯ | meʃitoɾɯ | 'arrest' |

The non-alternation between coronal stops and coronal fricatives is due to the following constraint:

(61) Constraint 20

**IDENT-IO(cont)[cor]**: Corresponding coronal segments must have the same value for [continuant].[72]

Non-deletion of /s/ or /t/ from /kas+te/, on the other hand, is due to a constraint that militates against deletion of coronal obstruents, which I formulate as follows:

(62) Constraint 21

**MAX-IO[+obs][cor]**: No deletion of coronal obstruents.[73]

Neither IDENT-IO(cont)[cor] nor MAX-IO[+obs][cor] is violated by any of the optimal candidates we have discussed so far in this chapter (i.e. /sin+te/ → [ʃinde] 'dying' (45), /kaɾ+te/ → [katte] 'mowing, cutting' (54), /kaw+te/ → [katte] 'buying' (55), /tob+te/ → [tonde] 'flying, jumping' (56), and /kam+te/ → [kande] 'biting' (56)[74]); in fact, these two constraints are never violated anywhere in the language. Therefore, I consider that both

[72] This constraint can replace Lombardi's (1998) MAX-IO[+strident]. MAX-IO[+strident] can militate against /s/ → [t] but cannot prohibit /t/ from surfacing as [s]. Thus, MAX-IO[+strident] is not as useful as IDENT-IO (cont)[cor].

[73] There are cases in which /ɾ/ and/or /b/ is deleted (e.g. /keɾeba/ → [kʲa] 'if', see Chapter 4, 4.6.2) so that both [+obs] and [cor] are necessary.

[74] None of /ɾ/ → [t], /w/ → [t], /b/ → [n] and /m/ → [n] violates IDENT-IO(cont)[cor] because (i) both /ɾ/ and /t/ are [cor] and [-cont] and (ii) /w/, /b/ and /m/ are not [cor] so that IDENT-IO(cont)[cor] is irrelevant.

IDENT-IO(cont)[cor] and MAX-IO[+obs][cor] are undominated. Here is a revised tableau of (58).

(63) Tableau for /kas+te/ 'lending' (revised)

| Input: /kas+te/ | CODA COND | CV LINK | ID(cont) [cor] | MAX [+obs][cor] | DEP -V | MAX (Open) | ID (ant) |
|---|---|---|---|---|---|---|---|
| a. ☞ kaʃite | | | | | * | | * |
| b. katte | | | *! | | | | |
| c. kasse | | | *! | | | | |
| d. kase | | | | *! | | | |
| e. kate | | | | *! | | * | |
| f. kasite | | *! | | | * | | |
| g. kaste | *! | | | | | | |

With the addition of undominated IDENT-IO(cont)[cor] and MAX-IO[+obs][cor], [kaʃite] is correctly selected as optimal this time.

A question arising from here is why the inserted vowel is /i/, not /ɯ/ or any other vowel. In accounting for epenthetic vowels of Lenakel (i.e. [ɨ] and [ə]), Kager (1999:127) invokes three markedness constraints: ***[+low]**, ***[+round]** and ***[-back]**. From the point of view of markedness, Lombardi (2002:5) also claims that the usual epenthetic vowel is /i/ if neither schwa nor /ɨ/ is present in a given language, and she gives more than a dozen languages with the epenthetic /i/ as examples. Japanese does not possess central vowels so the choice of /i/ as the epenthetic vowel in the *te*-form of /s/-final root verbs is cross-linguistically well supported.[75] Based on this argument, we could incorporate such constraints as *[+back], *[-high] and IDENT-V-IO[76] into the constraint ranking in (57). However, when vowel deletion takes place in casual speech in order to satisfy ONSET, it is /i/ that is deleted from hiatus in such words as /mi+te#i+ɾɯ/ 'be watching' (see Chapter 1

[75] In word-borrowing, the epenthetic vowel is /ɯ/ (but /o/ after /t/ and /d/), as seen in Chapter 1, 1.2. However, once a loanword is adopted in the Japanese way, the form with epenthetic vowel(s) becomes the underlying representation, so /ɯ/ is not considered to be epenthesised.

[76] This constraint would be needed so that vowels in the underlying representation would surface without their features being altered.

(11)) due to its low sonority,[77] so that it is not feasible to invoke *[+back] or *[-high]. Since we are discussing the features of the epenthetic vowel which is not present in the underlying representation, I propose the following constraints instead:

(64) Constraints 22

a. **DEP-IO[+back]**: No insertion of [+back].

b. **DEP-IO[-high]**: No insertion of [-high].

Vowel lengthening often occurs in causal speech when adjectives and adverbs are uttered in an emphatic way,[78] but I cannot think of any case of simple vowel insertion in Japanese, other than the case we are currently dealing with (i.e /s/ directly followed by /t/). Therefore, I assume that the above two constraints are undominated. Here is a revised constraint ranking:

(65) Constraint ranking 12

CODACOND, CVLINKAGE(I), DEP-IO[+back], DEP-IO[-high], IDENT-IO(cont)[cor], MAX-IO[+obs][cor], *NC̥, NOVOIGEM, *wV[-low]

>>

DEP-V-IO, IDENT-ONSET-IO(place)

>>

IDENT-IO(place), IDENT-IO[+ObsVoice], MAX-IO(Open)

>>

IDENT-IO(anterior)

>>

IDENT-IO(nasal)

>>

DEP-IO, IDENT-IO(voice)

With two new constraints, Tableau (63) will now look as follows (a few more candidates are added to the tableau to show the effects of DEP-IO[F] constraints):

[77] For further discussion on vowel deletion from hiatus, see Chapter 3, 3.3.

[78] See Chapter 8 for vowel lengthening in casual speech.

(66) Tableau for /kas+te/ 'lending' (further revised)

| Input: /kas+te/ | CODA COND | CV LINK | DEP [+back] | DEP [-high] | ID(cont) [cor] | MAX [+obs][cor] | DEP-V | ID (ant) |
|---|---|---|---|---|---|---|---|---|
| a. ☞ kaʃite | | | | | | | * | * |
| b. katte | | | | | *! | | | |
| c. kasse | | | | | *! | | | |
| d. kate | | | | | | *! | | |
| e. kase | | | | | | *! | | |
| f. kasete | | | | *! | | | * | |
| g. kasɯte | | | *! | | | | * | |
| h. kasite | | *! | | | | | * | |
| i. kaste | *! | | | | | | | |

### 2.3.4 /g/ +/te/ → [ide] / /k/ + /te/ → [ite]

Historically, the *te*-form of a consonant-final root verb was underlyingly /ROOT+i+te/, and those of /kag/ 'smell' and /kak/ 'write' were [kagite] and [kakite], respectively. In the *Heian* period (794-1192), however, due to weak occlusion of the velar stops, intervocalic /gi/ and /ki/ started to surface simply as [i] (Mabuchi 1971:83, Okumura 1972:116, and Tsukishima 1988:80-81, among others). Hence, /kag+i#te/ → [kaide][79] 'smelling' and /kak+i#te/ → [kaite] 'writing'. This process is called '*i-onbin*', and its consequence is still systematically observed in the *te*-form of /g/- and /k/-final root verbs, even though the underlying representation no longer has /i/ before /te/.[80]

*I-onbin* started as a process of velar stop deletion,[81] but De Chene & Anderson (1979) regard it as an alternation of velar stops with [i] before suffixes beginning with /t/.[82]

---

[79] It seems that [+voice] of /g/ was passed onto /t/ in this process. Accounting for this, however, is beyond the scope of this dissertation.

[80] Imaizumi (2000) argues that the underlying representation of the *te*-form of a consonant-final root verb is still /ROOT+i+te/ and that the process in question is due to velar stop deletion while the *te*-form of all the other consonant-final root verbs involves i-deletion. However, the deletion of a root-final consonant, except that of /w/ before a non-low vowel due to undominated *wV[-low], is not observed elsewhere in Japanese and, furthermore, his argument cannot account for non-reduction of /ROOT+i+ta+i/ 'want to' (e.g. /kak+i+ta+i/ → [kakitai]/*[kaitai] 'want to write'). (He ascribes the non-deletion of /i/, /g/ or /k/ from /ROOT+i+ta+i/ to structural differences from /ROOT+i+te/ but his argument seems somewhat arbitrary to me.)

[81] In the mid-*Heian* period, /si/ → [i] was also observed (Hashimoto 1950:84-86, Tsukishima 1988:80-81).

Historically, this was definitely incorrect but it may well be the case in Modern Japanese. Let us first assume that it is the case. Here are tableaux for /kag+te/ → [kaide] 'smelling' and /kak+te/ → [kaite] 'writing' (candidates that violate undominated constraints, except for DEP-IO[+back], are omitted from the tableaux).[83]

(67) Tableaux for /kag+te/ 'smelling' and /kak+te/ 'writing'

| Input: /kag+te/ | DEP [+back] | DEP -V | ID (place) | ID [+ObsVoi] | ONS | *g | ID (nas) | ID (voi) |
|---|---|---|---|---|---|---|---|---|
| a. kaide | | | * | | *! | | | * |
| b. ☹ kande | | | * | | | | * | * |
| c. kanne | | | * | | | | **! | * |
| d. kaite | | | * | | *! | | | |
| e. katte | | | * | *! | | | | * |
| f. kagite | | *! | | | | * | | |
| g. kaŋite | | *! | | | | | * | |
| h. kaɯde | *! | | | | * | | | * |

| Input: /kak+te/ | DEP[+back] | DEP-V | ID(place) | ONS | ID(nas) | ID(voi) |
|---|---|---|---|---|---|---|
| i. kaite | | | * | *! | | * |
| j. ☹ katte | | | * | | | |
| k kande | | | * | | *! | ** |
| l. kakite | | *! | | | | |
| m. kaɯte | *! | | | * | | * |

In both tableaux the actual outputs, (67a) and (67i), are eliminated due to an ONSET violation, and *[kande] and *[katte] are incorrectly selected as optimal for /kag+te/ 'smelling' and /kak+te/ 'writing', respectively. So that the actual outputs do not violate

[82] k → j/__t seems to have been a common process in the transition from Latin to Romance languages, as seen in the following examples from Portuguese (Williams 1962): [perfektu] → [pəxfeitu] and [ɔkto:] → [oitu].

[83] In both tableaux, candidates with /ɯ/ instead of /i/ are eliminated by DEP-IO[+back]. We could, however, invoke Boersma's (1998) *EFFORT to eliminate them so that in the actual outputs the distance between the vowel and /t/ in /te/ will be minimal at the surface level.

Lombardi (1998) offers some proposals but does not provide a definite account of the process in question. One of her proposals to account for /g+te/ → [ide] is to invoke MAXVOICE. However, if the velar surfaces as a vowel, MAXVOICE is satisfied so that /t/ does not have to surface as [d], thus her proposal is not acceptable.

ONSET, we could consider that [ai] is a diphthong.[84] According to the definition of diphthongs in Japanese which a number of phoneticians employ, [ai] (HL) is a diphthong but [ai] (LH) is not. Both [kaide] 'smelling' (67a) and [kaite] 'writing' (67i) have the HLL pattern so that we could conclude that they do satisfy ONSET. However, not every [ai] in the *te*-form of velar-final root verbs has the HL pattern; we do have /ak+te/ → [aite] (LHH) 'opening', /sak+te/ → [saite] (LHH) 'blooming', /nak+te/ → [naite] (LHH) 'crying' and so forth. As far as /kag+te/ → [kaide] 'smelling and '/kak+te/ → [kaite] 'writing' are concerned, we could get around an ONSET violation by treating [ai] as a diphthong but this is just a temporary makeshift solution and it does not solve the problem.

Alternatively, we could assume that IDENT-IO(place) is irrelevant to a correspondence between a consonant and a vowel. This appears to work well for /k+te/, but we still have a problem with /g+te/; the actual output [kaide] (67a) violates low-ranking IDENT-IO(voice) while *[kaite] (67d) does not, so that the latter will be selected as optimal for /kag+te/ 'smelling' if we rely on this assumption.[85]

We could further propose such a constraint as IDENT-IO[dor] to account for non-alternation of velars with coronals in order to prevent /kag+te/ and /kak+te/ from surfacing as [kande] and [katte], respectively, but this would fail to explain why a root-final velar glide surfaces as [t] in the *te*-form (e.g. /kaw+te/ → [katte] 'buying'). Ultimately, we could invoke IDENT-IO[-lab/+dor] so that /w/ would not be targeted by this constraint.

However, the approach I take here is a quite unconventional one and, as far as I know, no one has attempted this approach for the Japanese data at hand. In order to account for the alternation of velar stops with the high front vowel in the formation of the *te*-form, I propose that verbs with a root-final velar stop have two distinct underlying

[84] There does not seem to be agreement among phonologists on what counts as a diphthong in Japanese. For instance, Hattori (1979:159-160) considers [ai] in [kai] (HL) 'shell' as a diphthong but that in [kai] (LH) 'worth doing' as a set of monophthongs. Sakuma (1963:203-204) agrees with Hattori when the pitch of the second segment goes down but when the pitch does not go down, he believes whether it is considered to be a diphthong or not depends on how it is pronounced. Maeda (1954) appears to treat every [ai] as a diphthong, while Kindaichi (1967:116) argues that there is no diphthong in Japanese because the second segment can be separated from the first.

[85] We dismissed such a constraint as MAX-IO[+ObsVoice] (see fn.65), so it cannot solve the problem either.

representations: one when directly followed by vowel-initial suffixes[86] and the other when directly followed by consonant-initial suffixes (i.e. /te/ and /ta/).

It is not uncommon to assume two distinct underlying representations to account for stem alternants. For instance, Cameron-Faulkner & Carstairs-McCarthy (2000) argue that, among masculine singular nouns in Polish, some have a distinct underlying representation only for the locative and/or the vocative (e.g. *profesorz* (*rz* pronounced as [ʐ]) for the locative and the vocative and *profesor* for the other cases). Polish has undergone several processes of palatalisation, triggered originally by the front vowels [i] and [e] and glide [j], and further changes have left these palatalisations synchronically rather opaque. One of the consequences is that the output of the palatalisation of stem-final [r] is no longer [$r^j$] but [ʐ] before the locative and vocative suffix /e/ (Cameron-Faulkner & Carstairs-McCarthy 2000: 820),[87] thus the alternation of [r] and [ʐ] is not due to constraint interaction but to distinct lexical entries.[88]

As mentioned earlier, *i-onbin* started as a process of velar deletion and it can be accounted for from a derivational analytical point of view as follows:

(68) *I-onbin* in Classical Japanese[89]

| | | |
|---|---|---|
| | /kag+i+te/ 'smelling' | /kak+i+te/ 'writing' |
| velar deletion | kaite | kaite |
| voicing | kaide | n/a |
| | [kaide] | [kaite] |

In Modern Japanese, the effect of *i-onbin* on the *te*-form is completely obscured and opaque due to the deletion of the morpheme /i/ from its underlying representation. However, the traces of *i-onbin* are still observed in adjectives (e.g. *atsui* > *atsuki* 'hot'; *hiroi* > *hiroki*

[86] Apart from /te/ and /ta/, all the other suffixes that directly follow consonant-final root verbs are vowel-initial. See (1) of this chapter for some of the vowel-initial suffixes. Also see Chapter 9, 9.6 for discussion on verbal suffixes.
[87] Zulu, a member of a completely different language family from Japanese and Polish, has also left traces of phonological changes in the formation of passives, the underlying representation of which should be considered to be distinct from that of the other forms. See Doke (1973:136-137) for further details.
[88] Further to an OT analysis of lexical allomorphy, see Kager (to appear) who provides an account of Dutch allomorphs.
[89] Intervocalic velar deletion is also observed in Turkish (Sprouse 1997:3, Orgun & Sprouse 1999:11).

'wide, spacious')[90] and a limited number of words (e.g. *tsuigaki* > *tsukigaki* 'roofed mud-wall', *kaimaki* > *kakimaki* 'sleeved coverlet'), which clearly indicates that the process we are dealing with is not [g/k]~[i] alternation but velar deletion. Based on this argument, I propose the following underlying representations for velar-final root verbs:

(69) Underlying representations for velar-final root verbs

a. /-g/ and /-k/ when followed by vowel-initial suffixes.

b. /-i$^{[+voice]}$/ and /-i/ when followed by consonant-initial suffixes.

There are two more constraints required to account for /kai$^{[+voice]}$+te/ → [kaide] 'smelling' and /kai+te/ → [kaite] 'writing'. /-i$^{[+voice]}$/ has a floating feature,[91] which must be parsed so that, when followed by /te/, together they surface as [ide]. The constraint that militates against the deletion of the floating feature is **MAX-IO(Float)**. The other constraint is **CONTIG-IO(Open)**,[92] which prevents insertion of segments before /i/ in spite of an ONSET violation.

(70) Constraints 23

a. **MAX-IO(Float)**: No deletion of floating features.

b. **CONTIG-IO(Open)**: No medial insertion/deletion of segments within an open-class item.[93]

In regard to the ranking of these constraints, as long as MAX-IO(Float) and CONTIG-IO (Open) dominate IDENT-IO(voice) and ONSET, respectively, [kaide] and [kaite] should surface as optimal for /kai$^{[+voice]}$+te/ 'smelling' and /kai+te/ 'writing', respectively. However, as there is no evidence at hand which indicates that these constraints are violable,

[90] The forms without k-deletion are still often used in poems and lyrics in Modern Japanese.

[91] Floating features occur cross-linguistically. Among them, probably the best known is a floating tone, but other features are not uncommon and are observed even in English and German, which have a floating vowel feature (Roca & Johnson 1999:160-165). See Kager (to appear) and Akinlabi (1996) for an OT analysis of floating mora and that of a number of other non-tonal floating features, respectively.

[92] **DEP-IO(Root)** is another possible option.

[93] In (11) we did not consider a candidate with consonant insertion to break up hiatus (e.g. *[aʔida]/*[atʃida] for /aida/ 'interval'). However, such a candidate has no chance of beating the actual output due to a CONTIG-IO(Open) violation. In Chapter 1, (11) we saw /mi#aw+i/ → [mijai] 'marriage meeting', in which the glide insertion does not incur a CONTIG-IO(Open) violation due to a word boundary between /mi/ and /aw/.

I assume that they are undominated. Here are the tableaux for /kai[+voice]+te/ 'smelling' and /kai+te/ 'writing'.

(71) Tableaux for /kai[+voice]+te/ 'smelling' and /kai+te/ 'writing'

| Input: /kai[+voice]+te/ | CONTIG (Open) | MAX (Float) | IDENT (place) | MAX (Open) | ONSET | IDENT (nasal) | IDENT (voice) |
|---|---|---|---|---|---|---|---|
| a. ☞ kaide | | | | | * | | * |
| b. kade | | | | *! | | | * |
| c. kande | | | *! | | | * | * |
| d. kaite | | *! | | | * | | |
| e. kaŋite | *! | * | | | | | |

| Input: /kai+te/ | CONTIG (Open) | IDENT (place) | MAX (Open) | ONSET | IDENT (voice) |
|---|---|---|---|---|---|
| f. ☞ kaite | | | | * | |
| g. kate | | | *! | | |
| h. katte | | *! | | | * |
| i. kakite | *! | | | | |

By assuming two distinct underlying representations, we can successfully account for the formation of the *te*-form of velar-final root verbs without invoking rather ad hoc IDENT-IO[-lab/+dor].

The final constraint ranking for the *te*-form phonology is as follows:

(72) Constraint ranking 13

CODACOND, CVLINKAGE(I), CONTIG-IO(Open), DEP-IO[+back], DEP-IO[-high], IDENT-IO(cont)[cor], MAX-IO[+obs][cor], MAX-IO(Float), *NC̥, NOVOIGEM, *wV[-low]

>>

DEP-V-IO, IDENT-ONSET-IO(place)

>>

IDENT-IO(place), IDENT-IO[+ObsVoice], MAX-IO(Open)

>>

IDENT-IO(anterior), ONSET, *g

>>

IDENT-IO(nasal)

>>

DEP-IO, IDENT-IO(voice)

## 2.4 SUMMARY

In this section, I have discussed general phonology and *te*-form phonology.

In order to account for alternations observed in verbal paradigms, I have invoked Itô & Mester's (1995b) CVLINKAGE(I) and CVLINKAGE(*TU), along with CODACOND and ONSET, and have proposed two M-PARSE constraints, namely M-PARSE(neg) and M-PARSE (tense), as well as *wV[-low], IDENT-IO(anterior) and IDENT-IO(strident).

To account for the alternations of the *ha*- and *ra*-column consonants, the following constraints have been proposed: CVLINKAGE(*HI), CVLINKAGE(*HU), *[ɾ and *Nɾ. To account for the alternation of the *ga*-column consonants, on the other hand, IDENT-IO (nasal), *[ŋ and *g have been brought in and their interaction with IDENT-ONSET-IO(place) and MAX-IO(Open) has been discussed in the relevant subsection.

Sequential voicing has been discussed in depth by Itô & Mester's (1997, 1998, 2003). I have pointed out, contrary to their argument, that IDENT-IO[+voice] should actually dominate NO-$D^2_m$ by presenting /didi/ → [dʒidʒi] 'grandfather, old man' and /baba/ → [baba] 'grandmother, old woman' which cannot be accounted for if NO-$D^2_m$ outranks IDENT-IO[+voice].

The formation of the *te*-form posed a number of problems to solve. Many of the root-final consonants surface as coronals (i.e. either [t] or [n]) before /te/; this is due to the interaction of undominated CODACOND and NOVOIGEM (Itô & Mester 1995b) with high-ranking IDENT-ONSET-IO(place) and DEP-V-IO. The voicing of the suffix-initial /t/ in some cases is due to *NC̥ (Pater 1999). The lack of an alternation of coronal fricatives with coronal stops and non-deletion of coronals, on the other hand, are due to IDENT-IO(cont) [cor] and MAX-IO[+obs][cor], respectively. When the root-final consonant cannot surface either as [t] or as [n], as is the case with /s/, a vowel is inserted. The choice of the epenthetic vowel is determined through the interaction of faithfulness constraints on vowels and, along a similar line to Kager (1999) and Lombardi (2002) but with some differences, I have accounted for the Japanese epenthetic vowel by employing DEP-IO[+back] and DEP-IO[-high]. The most challenging problem was posed by the formation of the *te*-form of velar-final root verbs, where at first sight velar stops seemed to surface as [i]. I have suggested, however, that this should be accounted for by assuming a distinct underlying representation for the *te*-form.

In (42) we have established the following constraint ranking for general phonology:

(73) Constraint ranking 14

CODACOND, CVLINKAGE(*HI), CVLINKAGE(*HU), CVLINKAGE(I), CVLINKAGE (*TU), M-PARSE(neg), M-PARSE(tense), *[ŋ, *Nɾ, *[ɾ, *wV[-low]
>>
IDENT-ONSET-IO(place)
>>
IDENT-IO(place), IDENT-IO(lateral), IDENT-IO[+voice], MAX-IO(Open)
>>
IDENT-IO(anterior), ONSET, NO-$D^2_m$, *g
>>
IDENT-IO(nasal), IDENT-IO(strident), REALISE-M
>>
IDENT-IO(voice), NO-D

I wish to add to this constraint ranking two more constraints that will be of relevance to our discussion on casual speech.

(74) Constraints 24

a. **MAX-V-IO**: No deletion of vowels (Kager 1999).

b. **MAX-C-IO**: No deletion of consonants (ibid.).

In formal speech, no underlying vowel is deleted, so MAX-V-IO is undominated. MAX-C-IO, on the other hand, is a violable constraint as can be seen in the paradigm of a /w/-final root verb, such as /kaw/ 'buy' (1.iii).[94] I assume that it is ranked together with MAX-IO (Open) among others.[95]

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[94] Strictly speaking, /w/ is [-cons] so may not be considered as a consonant. However, as /w/ and /ɯ/ never alternate thus /w/ never surfaces as a vowel in Japanese, I treat /w/ as a consonant in this thesis.

[95] IDENT-ONSET-IO(place) >> IDENT-IO(place), MAX-IO(Open), MAX-C-IO can actually be established as seen in the following tableau for /kaw+ɯ/ 'buy':

| Input: /kaw+ɯ/ | IDENT-ONSET-IO(place) | IDENT-IO(place) | MAX-IO(Open) | MAX-C-IO | ONSET |
|---|---|---|---|---|---|
| a. ☞ kaɯ | | | * | * | * |
| b. kajɯ | *! | * | | | |

Let us combine (73) and the two additional Max-IO constraints with (72). The result will be the grammar underlying formal Japanese speech, and will be considered as the original constraint ranking on which reranking of constraints in casual speech is based. Note that Ident-IO[+voice] has been replaced with Ident-IO[+ObsVoice] and that Realise-M has been demoted so that *Struc, which will be introduced in Chapter 4, can intervene between Ident-IO(nasal) and Realise-M (see fn.50).

(75) Constraint ranking for formal speech

| Faithfulness constraints | | Markedness constraints | Others |
|---|---|---|---|
| Ident family | Others | | |
| Ident-IO(cont)[cor] | Contig-IO(Open)<br>Dep-IO[+back]<br>Dep-IO[-high]<br>M-Parse(neg)<br>M-Parse(tense)<br>Max-IO(Float)<br>Max-IO[+obs][cor]<br>Max-V-IO | CodaCond<br>CVLinkage(*HI)<br>CVLinkage(*HU)<br>CVLinkage(I)<br>CVLinkage(*TU)<br>NoVoiGem<br>*NC̥<br>*[ŋ<br>*Nɾ<br>*[ɾ<br>*wV[-low] | |
| | >> | | |
| Ident-Onset-IO(place) | Dep-V-IO | | |
| | >> | | |
| Ident-IO(lateral)<br>Ident-IO(place)<br>Ident-IO[+ObsVoice] | Max-IO(Open)<br>Max-C-IO | | |
| | >> | | |
| Ident-IO(anterior) | | Onset<br>No-D$^2_m$<br>*g | |
| | >> | | |
| Ident-IO(nasal)<br>Ident-IO(strident) | | | |
| | >> | | |
| | | | Realise-M |
| | >> | | |
| Ident-IO(voice) | Dep-IO | No-D | |

If Max-IO(Open) or Max-C-IO is ranked with Ident-Onset-IO(place), the tableau will incorrectly opt for *[kajɯ].

# CHAPTER THREE

## SYNCOPE IN THE *TE*-FORM WITH AUXILIARY VERBS

### 3.1 INTRODUCTION

In Japanese, syncope is frequently observed in casual speech, especially when the *te*-form of a verb is followed by vowel-initial auxiliary verbs. Unlike other environments where only a limited number of words and phrases seem to undergo syncope, the *te*-form with vowel-initial auxiliary verbs exhibits a very systematic process of syncope. This chapter is, thus, dedicated to accounting for this systematic syncope through the interaction of ONSET (Itô 1986, 1989), MAX-V-IO (Kager 1999) and a set of sonority-based *V constraints, to which I refer as the *V subhierarchy.

### 3.2 SYNCOPE IN CLASSICAL JAPANESE

In Classical Japanese, there was a tendency to avoid hiatus, and especially until the *Nara* period (710-794) hiatus was basically banned within single-morpheme words, frequently avoided within compound words, and from time to time avoided in phrases by means of vowel deletion.[1] (See Hashimoto (1950:210-214) for further discussion.) Here are some examples of vowel deletion from hiatus.[2]

(1) Vowel deletion from hiatus (Kishida 1984)

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | aɾa#iso | aɾiso | 'rough beach' |
| b. | ama#oɾi | amoɾi | 'descending from the sky' |
| c. | toko#iha | tokiha | 'Tokiwa (place name)' |
| d. | haja#ɯma | hajɯma | 'fast horse' |
| e. | ja#no#ɯti | janɯtʃi | 'inside of a house' |

[1] Vowel deletion is a cross-linguistically common strategy to avoid hiatus, and is observed in such languages as Greek (Foley 1977:46-48), Odawa (Piggot 1980; ref. to Lombardi 1997:13) and Yoruba (Pulleyblank 1988:242-243), as well as Axininca Campa (McCarthy & Prince 1994a) and Fuzhou (Yip 1996:768) in their respective processes of reduplication.

[2] The phonetic transcription in (1) is based on Modern Japanese phonetics and it may not necessarily represent the actual pronunciation in Classical Japanese.

| | | | |
|---|---|---|---|
| f. | aka#isi | akaʃi | 'Akashi (place name)' |
| g. | kaha#omo | kahamo | 'surface of a river' |
| h. | ko#ihe | kohe | 'small house' |

In regard to the principles of vowel deletion from hiatus, Mabuchi (1971) summarises predecessors' works as follows:

> ... when a vowel is deleted from hiatus created as a result of concatenating a vowel-final word with a vowel-initial word, dropping the final vowel of the first word is the norm. However, if the sonority of the initial vowel of the second word is lower than that of the final vowel of the first word, the initial vowel of the second word may drop (1971:47).

What this means is that, in $CV_1\#V_2$, (i) when $V_2$ is more sonorous than $V_1$, $V_1$ drops and (ii) when $V_1$ is more sonorous than $V_2$, $V_1$ should still drop but $V_2$ may drop instead. In each hiatus of the examples in (1), the second vowel is less sonorous than the first vowel, and in (1a-e), following the principle, the first vowel is deleted, while in (1f-h) the second vowel is deleted. They all comply with the rule (ii) above, but how will we know exactly which vowel is deleted when $V_1$ is more sonorous than $V_2$?

It seemed to me at first that the less sonorous vowel was deleted from hiatus in principle unless this would lead to a violation of the OCP (Goldsmith 1976) (e.g. (1a-d)) and that, if deletion of either vowel would lead to an OCP violation (e.g. (1f-g)), then the less sonorous vowel was deleted according to the principle. This could actually account for the vowel deletion observed in all the examples above, except for (1e), and we could consider (1e) as an isolated case. However, there are, in fact, far too many cases in which the OCP and the vowel sonority cannot account for the actual choice of the deleted vowel.

What we know for sure about Classical Japanese is that hiatus was avoided so that an ONSET violation was not incurred. Within the framework of OT, this can be accounted for through the interaction of ONSET and MAX-V-IO. In Modern Japanese, MAX-V-IO is an undominated constraint in formal speech so that vowel deletion does not take place to resolve onsetless syllables, but in Classical Japanese, apparently ONSET outranked MAX-V-IO. Let us take (1a) and (1h) as examples to see how ONSET >> MAX-V-IO performs.

(2) Tableaux for /aɾa#iso/ 'rough beach' and /ko#ihe/ 'small house'[3]

| Input: /aɾa#iso/ | ONSET | MAX-V-IO |
|---|---|---|
| a. ☞ aɾiso | * | * |
| b. ☹ aɾaso | * | * |
| c. aɾaiso | **! | |

| Input: /ko#ihe/ | ONSET | MAX-V-IO |
|---|---|---|
| d. ☞ kohe | | * |
| e. ☹ kihe | | * |
| f. koihe | *! | |

In both tableaux the candidates with hiatus is eliminated by ONSET but the other candidates cannot be differentiated. It does seem that the OCP and vowel sonority played some role in Classical Japanese but, because establishing the constraint ranking in Classical Japanese is beyond the scope of this thesis, I will leave it to be decided by future investigation.

## 3.3 HIATUS AVOIDANCE IN MODERN JAPANESE

In Modern Japanese, with the exception of a number of words that have gone through lexicalisation, such as /hada#asi/ → /hadasi/ → [hadaʃi] 'bare foot', syncope is no longer observed in the process of making compound words, due to the promotion of MAX-V-IO above ONSET.

(3) Non-avoidance of hiatus[4]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | kaɾɯ#isi | kaɾɯiʃi | 'floatstone' (/kaɾɯ/: 'light', /isi/: 'stone') |
| b. | hoho#em+ɯ | hohoemɯ | 'smile' (/hoho/: 'cheek', /em/: 'smile', /ɯ/: suffix) |
| c. | haja#asi | hajaaʃi | 'quick pace' (/haja/: 'quick', /asi/: 'foot, leg') |
| d. | asi#oto | aʃioto | 'footstep' (/asi/: 'foot, leg', /oto/: 'sound') |
| e. | ɯti#ɯmi | ɯtʃiɯmi | 'inland sea' (/ɯti/: 'inside', /ɯmi/: 'sea')[5] |

[3] DEP-IO is a low-ranking constraint in Modern Japanese, but it is hard to determine where in the constraint hierarchy it was ranked in Classical Japanese, because there were cases, such as /haɾɯ#ame/ → [haɾɯsame] 'spring rain' and /hi#ame/ → [çisame] 'chill rain', where hiatus was avoided by way of consonant insertion. (In the case of /ame/ 'rain', however, we could assume that there are two allomorphs, /ame/ and /same/.)

An ONSET violation by a word-initial vowel was not avoided in Classical Japanese, and it is not avoided in Modern Japanese either. This was because **ANCHOR-IO** (no deletion/insertion at edges; McCarthy & Prince 1995) dominated ONSET. As an alternative solution to this ONSET violation, we could argue that a glottal stop is added to a vowel-initial word (e.g. /o+baa#saN/ → [ʔoba:saN] 'grandmother, old woman'), as is argued by Shirota (1995:45), for a glottal stop is sometimes perceivable when a vowel is preceded by a pause.

[4] These examples are from Kenkyusha's New Japanese-English Dictionary Fourth Edition (1974) (henceforth, NJED).

[5] /ɯti#ɯmi/ → [ɯtsɯmi] can be observed in place names and surnames.

However, in casual speech, syncope does crop up from time to time and the most obvious and productive example is the one in the *te*-form followed by vowel-initial auxiliary verbs.

In formal speech, when a vowel sequence is created in the concatenation of the *te*-form with a vowel-initial auxiliary verb, hiatus is left unscathed and the vowel sequence surfaces as it is. MAX-V-IO dominating ONSET ensures that no vowel is deleted.

(4) *Te*-form with vowel-initial auxiliary verbs in formal speech[6]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | tabe+te#i+ɾɯ | tabeteiɾɯ[7] | 'be eating' |
| b. | mat+te#iɾaʃʃaɾ+ɯ | matteiɾaʃʃaɾɯ | 'be waiting (RESPECTFUL)' |
| c. | kie+te#ik+ɯ[8] | kieteikɯ | 'die down gradually' |
| d. | kaw+te#ok+ɯ | katteokɯ | 'buy in advance' |
| e. | ne+te#oɾ+ɯ | neteoɾɯ | 'be sleeping (HUMBLE)' |
| f. | mi+te#age+ɾɯ | miteaŋeɾɯ | 'check (as a favour)' |
| g. | sime+te#aɾ+ɯ | ʃimeteaɾɯ | 'have been closed' |

In casual speech, on the other hand, the less sonorous vowel is deleted in order to avoid an onsetless syllable, as shown below.[9]

(5) *Te*-form with vowel-initial auxiliary verbs in casual speech

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | tabe+te#i+ɾɯ | tabeteɾɯ | 'be eating' |
| b. | mat+te#iɾaʃʃaɾ+ɯ | matteɾaʃʃaɾɯ | 'be waiting (RESPECTFUL)' |
| c. | kie+te#ik+ɯ | kietekɯ | 'die down gradually' |
| d. | kaw+te#ok+ɯ | kattokɯ | 'buy in advance' |
| e. | ne+te#oɾ+ɯ | netoɾɯ | 'be sleeping (HUMBLE)' |
| f. | mi+te#age+ɾɯ | mitaŋeɾɯ | 'check (as a favour)' |
| g. | sime+te#aɾ+ɯ | ʃimetaɾɯ | 'have been closed' |

[6] /i/, /iɾaʃʃaɾ/, /ik/, /ok/, /oɾ/, /age/ and /aɾ/ can all be used as full verbs meaning 'exist, stay', 'exist, stay, go, come (RESPECTFUL)', 'go', 'put, place', 'exist, stay (HUMBLE)', 'give' and 'exist', respectively. /ɾɯ/ is a suffix attached to a vowel-final root verb to indicate the non-past tense (cf. /ɯ/, attached to a consonant-final root verb).

[7] /i+ɾɯ/ was /wi+ɾɯ/ in Classical Japanese, which was realised as [wiɾɯ]. The concatenation of this auxiliary verb with the *te*-form, therefore, did not create hiatus in Classical Japanese.

[8] /k/ is palatalised when followed by a front vowel. For convenience sake, however, I employ [k] for both this palatalised voiceless velar stop and the non-palatalised counterpart.

[9] Syncope in the *te*-form followed by vowel-initial auxiliary verbs was already observed in such literature as *"Ukiyoburo"* (1809-1813), so it has been a common practice for at least two centuries.

Among the auxiliary verbs mentioned in (4) and (5), the most frequently used in speech is /i+ɾɯ/, and it was observed 1211 times in the data I collected for my Master's thesis (1995).[10] Here are some statistical data on its occurrence and how it was realised according to the degree of formality.[11]

(6) Occurrence and realisation of /te#i+ɾɯ/ according to the degree of formality

| | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [teiɾɯ] | 150 | (48%) | 75 | (15%) | 19 | (5%) | 244 | (20%) |
| [teɾɯ] | 160 | (52%) | 422 | (85%) | 385 | (95%) | 967 | (80%) |
| Total | 310 | (100%) | 497 | (100%) | 404 | (100%) | 1211 | (100%) |

/i/ is never deleted from /te#i+ɾɯ/ in news and narration because news readers and narrators are simply reading scripts, but when uttered spontaneously, /te#i+ɾɯ/ is very often realised as [teɾɯ] even in formal speech. I believe that this is due to frequency effects. Arisaka (1959:152) argues that commonly used words and phrases tend to be pronounced casually and to be realised incompletely but that they can still be understood because people are accustomed to such incomplete forms. As seen in (4a) and (5a), /te# i+ɾɯ/ is used to indicate the progressive aspect, but it is also used to describe habitual actions (e.g. /osie+te#i+ɾɯ/ 'teach (habitually)', cf. /osie+ɾɯ/ '(will) teach') and resultant states (e.g. /kom+te#i+ɾɯ/ 'be crowded', cf. /kom+ɯ/ 'become crowded'). The use of /te#i+ɾɯ/, therefore, is extremely common, and frequency effects produced by its common use must be playing an important role in i-deletion even in formal speech.

Let us return to hiatus avoidance by means of vowel deletion in casual speech. If we disregard frequency effects, hiatus is not avoided in formal speech and all vowels surface as they are, while vowels are readily deleted to avoid onsetless syllables in casual speech.

[10] See Appendix 1 for full details of the source of the data.

[11] 'Formal', 'semi-formal' and 'casual' speech includes the following, respectively:

a. Formal: interviews in a formal setting such as those with political leaders on TV, news reading, narration in TV documentaries, lectures, conference reports, and conversation between total strangers.

b. Semi-formal: interviews in a less formal setting such as those in TV variety shows, conversation between newscasters and between those who know each other but not too well, and addressing from juniors to seniors (except among family members).

c. Casual: conversation between those who know each other well, such as family members and close friends.

This means that in casual speech reranking of constraints takes place and that MAX-V-IO is demoted below ONSET. The difference between Classical Japanese and Modern Japanese with regard to syncope, however, is that in the latter the more sonorous vowel is never deleted to resolve hiatus. Based on this fact, I propose the following constraints and constraint ranking for syncope in Modern Japanese:

(7) Constraints 25[12] and constraint ranking 15

a. ***i**: No [i].
b. ***ɯ**: No [ɯ].
c. ***e**: No [e].
d. ***o**: No [o].
e. ***a**: No [a].
f. ONSET >> *i >> *ɯ >> *e >> *o >> *a >> MAX-V-IO

In regard to the constraint ranking, we can establish *i >> *e from (5a-c), *e >> *o from (5d-e) and *e >> *a from (5f-g), but we cannot establish the exact ranking of *ɯ and the relative ranking of *o and *a from the data at hand. However, the sonority hierarchy of a > o > e > ɯ > i (more sonorous to less sonorous) has been reported by individual researchers and institutes through their respective experiments[13] and is well established in Japanese phonetics. Therefore, I rank *ɯ between *i and *e, and *o higher than *a. [14]

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[12] The reason for proposing *i, *ɯ, etc., instead of a constraint requiring the less sonorous vowel to be deleted from hiatus, is that the *V subhierarchy can also correctly account for such vowel deletion processes as /anata/ → [anta] 'you' and /no#de/ → [nde] 'because' in casual speech as well as vowel coalescence (e.g. /ei+go/ → [e:ŋo]/*[i:ŋo] 'English'). Both Kirchner (1996) and Orgun (1996) propose **No V** (i.e. V is not allowed in open syllables). The *V constraints I am proposing, however, are context-free.

These constraints may remind the reader of Golston's (1996) Direct Optimality Theory. However, I do not intend to account for syncope or any other processes observed in casual Japanese speech from the point of view of pure markedness.

[13] According to Hattori, et al. (1957), the first formant of each Japanese vowel is: [a]: 790 Hz, [o]: 500 Hz, [e]: 460 Hz, [ɯ] 340 Hz and [i]: 250 Hz for males, and [a]: 950 Hz, [o]: 610 Hz, [e]: 590 Hz, [ɯ] 400 Hz and [i]: 290 Hz for females.

[14] Greek also displays sonority-based vowel deletion from hiatus. However, with the exception of Northern Greek which appears to have exactly the same constraint ranking as Japanese, Greek is different from Japanese in that it places *e higher than *u. (This may be because the high back vowel of Greek is rounded and, thus, more sonorous than the Japanese counterpart.) See Foley (1977:46-48) for further discussion on the sonority-based vowel deletion of Greek.

As discussed in the previous chapter, the epenthetic vowel in Japanese is the least sonorous [i] due to DEP-IO[+back] and DEP-IO[-high]. It is worth noting that the same vowel is the first to be deleted due to low sonority. Also note that DEP-IO[+back] and DEP-IO[-high] have no effect on vowel deletion.

If there are such constraints as the *V subhierarchy, one may wonder why vowels are not completely wiped out. When an open syllable is followed by a consonant, however, the vowel in the open syllable is protected by **NUCLEUS**, which is an undominated constraint, and ***COMPLEX**, which is ranked higher than the *V hierarchy.

(8) Constraints 26

a. **NUCLEUS**: Syllables must have a vowel (Prince & Smolensky 1993).

b. ***COMPLEX**: Syllables have at most one consonant at an edge (ibid.).

Japanese disallows complex onsets, except for coronal affricates, as discussed in Chapter 2, 2.2.1, and palatalised consonants, such as [$p^j$], [$m^j$] and [$ɾ^j$]. CODACOND (Itô 1986, McCarthy & Prince 1986) limits a licit coda consonant to the first half of a geminate, a nasal homorganic to the following stop or liquid, or a word-final moraic nasal. Therefore, random deletion of vowels would simply end up creating consonant clusters that cannot be parsed.

Also, a vowel in an open-class item is protected by MAX-IO(Open), whether followed by a consonant or by another vowel, so that no vowel deletion takes place in open-class items. For instance, the following compound words have /te/ (meaning 'hand') followed by a vowel as a result of concatenation of morphemes but, unlike the *te*-form followed by vowel-initial auxiliary verbs, syncope never takes place even in casual speech, because both members of each compound belong to open class:

(9) Compound nouns with initial /te/ in formal and casual speech (from NJED)

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | te#iɾe | teiɾe / *teɾe | 'care' (/iɾe/: 'put, insert') |
| b. | te#ɯsɯ | teɯsɯ / *tesɯ | 'short of hands' (/ɯsɯ/: 'thin') |
| c. | te#oke | teoke / *toke | 'pail' (/oke/: 'tub') |
| d. | te#asi | teaʃi / *taʃi | 'arms and legs' (/asi/: 'foot, leg') |

This predicts that vowel deletion to resolve hiatus should be observed only in closed-class items. This prediction, in fact, proves right in the case of syncope in the *te*-form followed by vowel-initial auxiliary verbs. The following tableaux show how [tabeteɾɯ] and [kattokɯ] are selected as optimal candidates for /tabe+te#i+ɾɯ/ 'be eating' (5a) and

/kaw+te#ok+ɯ/ 'buy in advance' (5d), respectively: (Constraints that none of the candidates violates and some of the constraints that all the candidates violate equally are omitted from the tableaux in this chapter from now on.)

(10) Tableau for /tabe+te#i+ɾɯ/ 'be eating' in casual speech

| Input: /tabe+te#i+ɾɯ/ | CV LINKAGE | IDENT (ant) | ONSET | IDENT (stri) | *i | *ɯ | *e | *a | MAX-V-IO |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ tabeteɾɯ | | | | | | * | ** | * | * |
| b. tabetʃiɾɯ | | *! | | * | * | * | * | * | * |
| c. tabetiɾɯ | *! | | | | * | * | * | * | * |
| d. tabeteiɾɯ | | | *! | | * | * | ** | * | |

(11) Tableau for /kaw+te#ok+ɯ/ 'buy in advance' in casual speech

| Input: /kaw+te#ok+ɯ/ | ONSET | *ɯ | *e | *o | *a | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ kattokɯ | | * | | * | * | * |
| b. kattekɯ | | * | *! | | * | * |
| c. katteokɯ | *! | * | * | * | * | |

### 3.4 OPEN CLASS VERSUS CLOSED CLASS

In Classical Japanese, syncope frequently took place to avoid hiatus within compound words, but what triggers syncope is no longer any hiatus created in the process of making compound words in Modern Japanese,[15] and the *te*-form followed by vowel-initial auxiliary verbs seems to be the only context where syncope takes place systematically in order to get around hiatus. (Even so, it only occurs in casual speech.)

The *te*-form can precede just about any verb, and when the *te*-form is followed by vowel-initial full verbs, syncope does not take place even in casual speech, as seen in the following examples:

[15] This may be partly due to the fact that Modern standard Japanese is actually a dialect in Tokyo, which is not really a direct descendent of Classical Japanese which was a dialect in Kyoto. However, I believe that even in Kyoto dialect vowel deletion no longer takes place to avoid hiatus in open-class items.

(12) *Te*-form with vowel-initial full verbs in formal and casual speech

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | mi+te#oboe+ɾɯ | miteoboeɾɯ | 'watch and learn' |
| b. | os+te#ake+ɾɯ | oʃiteakeɾɯ | 'push and open' |
| c. | kaw+te#iɾe+ɾɯ | katteiɾeɾɯ | 'buy and put in' |
| d. | hoɾ+te#ɯme+ɾɯ | hotteɯmeɾɯ | 'dig and bury' |

In (12a) and (12b), /e/ in the suffix /te/ is less sonorous than the following vowel and, because it is part of a closed-class item, it should be deleted to satisfy ONSET. In (12c) and (12d), on the other hand, the second vowels in hiatus are less sonorous than /e/ but, as they belong to open-class items (i.e. /iɾe/ 'put, insert' and /ɯme/ 'bury', respectively), they cannot be deleted. When both MAX-IO(Open) and ONSET dominate MAX-V-IO in casual speech, we expect /e/ to drop from /te/ even when a high vowel follows, provided that this vowel belongs to an open-class item.[16] However, as mentioned above, syncope never takes place when the *te*-form is followed by vowel-initial full verbs. This suggests that some kind of alignment constraint and a constraint that militates against deletion at an edge are at work here. I formulate these constraints as follows:

(13) Constraints 27

a. **ALIGN-L(Open)**: The left edge of an open-class item must coincide with the left edge of a syllable.[17]

b. **ANCHOR-IO(Open)**: No deletion/insertion of segments at edges of an open-class item.[18]

ALIGN-L(Open) and ANCHOR-IO(Open) are variations of ALIGN-L (McCarthy & Prince 1993a)[19] and ANCHOR-IO (McCarthy & Prince 1995), respectively, but are class-specific constraints. Both constraints are violated when a low vowel is directly preceded by a high

[16] Another possible but not acceptable solution to an ONSET violation in this context is vowel coalescence. See Chapter 7 for further discussion.

[17] For discussion on **ALIGN-R(Open)** (the right edge of an open-class item must coincide with the right edge of a syllable), see Chapter 5, 5.5.3.

[18] Some phonologists (Hattori 1960, Kindaichi 1967 and McCawley 1968, among others) argue that a glottal stop is inserted between two members of a compound word when the second member starts with an identical vowel to the final vowel of the preceding word (e.g. /sato#oja/ → [satoʔoja] 'foster parent'). However, unless such a word is uttered very carefully or a pause is inserted between the two members, I do not think a glottal stop is perceivable at all.

[19] See McCarthy & Prince (1993b) for in-depth discussion on generalised alignments.

front vowel (e.g. /mi#aw+i/ → [mijai] 'marriage meeting', see Chapter 1, (11)),[20] so they cannot be undominated constraints.[21] However, they are considered to be high-ranking constraints, thus I rank them both in the same stratum as another class-specific constraint MAX-IO(Open).

Let us see how newly introduced ALIGN-L(Open) and ANCHOR-IO(Open) interact with other constraints before and after the reranking of constraints by taking /kaw+te# ok+ɯ/ ('buy and put on' where /ok/ is used as a full verb[22] and 'buy in advance' where /ok/ is used as an auxiliary verb) as an example.

(14) *Te*-form + open-class item (e.g./kaw+te#ok+ɯ/ 'buy and put on')

a. Before reranking (formal speech)

| Input: /kaw+te#ok+ɯ/ | MAX-V-IO | ALIGN-L (Open) | ANCHOR-IO (Open) | ONSET | *e | *o |
|---|---|---|---|---|---|---|
| a. ☞ katteokɯ | | | | * | * | * |
| b. kattokɯ | *! | * | | | | * |
| c. kattekɯ | *! | | * | | * | |

b. After reranking (casual speech)

| Input: /kaw+te#ok+ɯ/ | ALIGN-L (Open) | ANCHOR-IO (Open) | ONSET | *e | *o | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ katteokɯ | | | * | * | * | |
| b. kattokɯ | *! | | | | * | * |
| c. kattekɯ | | *! | | * | | * |

[20] Glide insertion is probably forced by a constraint that prohibits a cluster of V[+high]V[+low], which is only created in the process of concatenation of morphemes and never occurs within a single morpheme in Yamato and Sino-Japanese vocabulary. Let us provisionally call this constraint ***ia**.

[21] ANCHOR-IO(Open) is also violated when a /w/-final root verb is followed by a suffix with an initial non-low vowel (e.g. /kaw+ɯ/ → [kaɯ] 'buy'). This violation is due to the domination of ANCHOR-IO(Open) by undominated *wV[-low].

[22] In real life, a locative is probably inserted between [katte] and [okɯ], as in [sofa:okatteimaniokɯ] 'buy a sofa and put it in the lounge'. However, [katteokɯ] is a perfectly grammatical phrase which native speakers of Japanese should have no problem understanding.

(15) *Te*-form + closed-class item (e.g. /kaw+te#ok+ɯ/ 'buy in advance')

a. Before reranking (formal speech)

| Input: /kaw+te#ok+ɯ/ | MAX-V-IO | ALIGN-L (Open) | ANCHOR-IO (Open) | ONSET | *e | *o |
|---|---|---|---|---|---|---|
| a. ☞ katteokɯ | | | | * | * | * |
| b. kattokɯ | *! | | | | | * |
| c. kattekɯ | *! | | | | * | |

b. After reranking (casual speech)

| Input: /kaw+te#ok+ɯ/ | ALIGN-L (Open) | ANCHOR-IO (Open) | ONSET | *e | *o | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. katteokɯ | | | *! | * | * | |
| b. ☞ kattokɯ | | | | | * | * |
| c. kattekɯ | | | | *! | | * |

Beckman (1998:1) argues that cross-linguistically root-initial syllables, stressed syllables, syllable onsets, roots and long vowels are privileged positions which are psycholinguistically prominent and which bear the heaviest burden of lexical storage, lexical access and retrieval, and processing. As was discussed in the previous chapter, syllable onsets and roots are privileged positions in Japanese as well. In Japanese, however, there is a strong contrast between open-class items and closed-class items in terms of susceptibility to reduction, and open-class items should also be considered as privileged.[23]

## 3.5. SUMMARY

In this short chapter, I have discussed a process of syncope observed in casual speech when the *te*-form of a verb is followed by a vowel-initial auxiliary verb. In Classical Japanese, avoidance of hiatus by means of vowel deletion was a common practice, but due to the promotion of MAX-V-IO above ONSET, hiatus is now left unscathed in Modern Japanese, except in casual speech where constraint reranking takes place.

[23] In accounting for VVN (voiced velar nasalisation), Hibiya (1988:83) states that closed class escapes the plosive realisation more than open class in Japanese. It seems that the difference between open class and closed class also manifests itself in this regard.

There are two major differences in the process of hiatus avoidance by means of vowel deletion between Classical Japanese and casual speech in Modern Japanese. One is that in Modern Japanese the vowel to be deleted is always the one with less sonority. This is because of the establishment of the sonority-based *V subhierarchy (i.e. *i >> *ɯ >> *e >> *o >> *a). The other is that vowel deletion no longer takes places within an open-class item (because of MAX-IO(Open) >> ONSET) or across a boundary between an open-class item preceded by another item (because of ALIGN-L(Open), ANCHOR-IO(Open) >> ONSET). In Modern Japanese, open-class items require more faithfulness to the underlying representation than closed-class items, due to the burden of lexical storage they carry. In Beckman's terms, therefore, open-class items are 'privileged' in Japanese.

Before moving to the next chapter, let us recapitulate the constraint ranking in casual speech we have established so far. (Constraints that were not discussed in this chapter are omitted.)

(16) Constraint rankings 16[24]

a. Formal speech
CVLINKAGE(I), **MAX-V-IO**, NUCLEUS
>>
ALIGN-L(Open), ANCHOR-IO(Open)
*COMPLEX, MAX-IO(Open)
>>
IDENT-IO(anterior), ONSET
>>
IDENT-IO(strident)
>>
*i >> *ɯ >> *e >> *o >> *a

b. Casual speech
CVLINKAGE(I), NUCLEUS
>>
ALIGN-L(Open), ANCHOR-IO(Open)
*COMPLEX, MAX-IO(Open)
>>
IDENT-IO(anterior), ONSET
>>
IDENT-IO(strident)
>>
*i >> *ɯ >> *e >> *o >> *a
>>
**MAX-V-IO**

[24] *COMPLEX is a high-ranking constraint in Japanese but not undominated; it must be ranked in the third stratum with MAX-IO(Open) so that the constraint that requires an onset consonant to be palatalised (e.g. /poko+RED/ → [pʲokopʲoko] 'jumping around imprudently'; see Chapter 8, fn.53) can intervene between undominated constraints and *COMPLEX.

# CHAPTER FOUR

## FEATURAL MARKEDNESS

### 4.1 INTRODUCTION

In addition to vowel deletion, with which we have dealt in the previous chapter, casual Japanese speech exhibits a variety of contraction processes involving consonant deletion. For instance, /te#simaw+ɯ/ 'end up –ing', /keɾedomo/ 'although' and /keɾeba/ 'if' faithfully surface as [teʃimaɯ],[1] [keɾedomo] and [keɾeba] in formal speech, while in casual speech they are dramatically abbreviated to [tʃaɯ], [kedo] and [kʲa], respectively. At first sight it looks as though there were two distinct underlying representations for each of these, one for formal speech and the other for casual speech. However, the contraction in question can actually be easily accounted for, without positing any other underlying representation, with the demotion of two MAXIMALITY family constraints[2] and the introduction of two featural markedness constraints, *LAB (Smolensky 1993) and *ɾ (McCarthy & Prince 1995). In this chapter, I will propose a number of positional faithfulness constraints and discuss how *LAB and *ɾ interact with such constraints, as well as others, to account for contraction processes observed in casual Japanese speech.

### 4.2 UNDERPRONUNCIATION OF LABIALS

Underpronunciation of labials has been well attested throughout the history of Japanese. Classical Japanese saw the loss of /w/ before non-low vowels[3] and the gradual featural

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[1] /si/ → [ʃi] and /w+ɯ/ → [ɯ] are due to CVLINKAGE(I) and *wV[-low], respectively.

[2] One of the constraints is MAX-V-IO; its demotion below the *V subhierarchy and its implications were the focal point of the previous chapter.

[3] The merger of [wi], [we] and [wo] with [i], [e] and [o], respectively, in word-medial positions was already often observed circa 1100. Word-initial [wo] merged with [o] around 1000, while word-initial [wi], [we] and [wo] merged with [i], [e] and [o], respectively, in the *Kamakura* period (1192-1334) (Tsukishima 1988:79). In Classical Japanese there was no distinction between [wɯ] and [ɯ] (or possibly [wu] and [u], as there is no evidence to indicate that the high back vowel was unrounded back then) (Kishida 1998:50).

change of /p/ > /ɸ/ > /h/,[4] while Modern Japanese presents various instances of labial deletion in casual speech. The examples of the latter include the following:

(1) Labial deletion in casual speech[5]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | sɯm+i+mas+eN | sɯmimaseN | sɯimaseN[6] | 'excuse me, I am sorry' |
| b. | so+ɾe#de#wa | soɾedewa | soɾedʒa | 'then' |
| c. | mi+te#simaw+ɯ | miteʃimaɯ | mitʃaɯ | 'end up watching' |
| d. | keɾedomo | keɾedomo | keɾedo / kedo | 'although' |
| e. | keɾeba | keɾeba | $ke\text{ɾ}^{j}a$ / $k^{j}a$ | 'if' |

In terms of the place of articulation, labials are more marked than coronals (Prince & Smolensky 1993, Smolensky 1993, Beckman 1998) and the deletion of labials observed in casual Japanese speech is due to the following constraint:

(2) Constraint 28

***LAB**: No labials (Smolensky 1993).

We will closely examine (1c-e) in Sections 4.3-4.7, so let us focus on (1a-b) in this section.

4.2.1 [sɯimaseN] 'excuse me, I am sorry'

In Modern Japanese, except for /w/ before a non-low vowel, as we discussed in Chapter 2, 2.2.1 (e.g. /kaw+ɯ/ → [kaɯ] 'buy'), labials are never deleted from open-class items.

[4] See Chapter 2, 2.2.2 for further discussion on this.

[5] /sɯm/ is a verb root meaning 'be settled, be over'; /eN/ is a non-past negative morpheme which follows /mas/; /so/ is attached to a demonstrative stem, such as /ɾe/ 'one', and indicates that the person/object/place is closer to the listener; /de/ is a copula equivalent to the English 'be'; /wa/ is a particle used either to mark the topic or to make a contrast.

[6] Some phonologists consider /sɯm+i+mas+eN/ → [sɯimaseN] as *i-onbin*, on which I do not agree. The consequence of *i-onbin*, which mainly involved /ki/ and /gi/ in the *Heian* period (794-1192), is still systematically observed in the *te*-form of a verb with root-final /k/ or /g/ and i-adjectives in Modern Japanese (see Chapter 2, 2.3.4). On the other hand, among verbs with root-final /m/, /sɯm/ is the only one that appears to lose the root-final consonant before /i/. If *i-onbin* were the norm for /m+i/, I would expect to see many more cases in which the underlying /m+i/ surfaces as /i/.

(3) No deletion of labials from open-class items

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kam+i+mas+ɯ | kamimasɯ | kamimasɯ | 'bite (POLITE)' |
| b. | tob+i+mas+ɯ | tobimasɯ | tobimasɯ | 'fly, jump (POLITE)' |
| c. | kɯrɯma | kɯrɯma | kɯrɯma | 'car' |
| d. | kawai+i | kawai: | kawai: | 'cute' |
| e. | totemo | totemo | totemo[7] | 'very' |

This is because MAX-IO(Open) dominates *LAB. Therefore, (1a) appears to be an isolated case in which a higher-ranked constraint is violated to satisfy a lower-ranked constraint, but is this really the case? I assume that the deletion of the first labial from /sɯm+i+mas+eN/ was diachronically caused by its frequent use in conjunction with underpronunciation of labials, but it is very likely that the underlying representation of [sɯimaseN] 'excuse me, I am sorry' is no longer /sɯm+i+mas+eN/ because native speakers of Japanese, including myself, do not consider [sɯimaseN] as the polite negative non-past form of /sɯm/ 'be settled, be over'. In fact, when one means to say 'not be settled, not be over', the labial in question is never deleted even in casual speech, and its deletion can only be observed when one means to say 'excuse me, I am sorry'. Thus, my conclusion is that [sɯimaseN] is not the output of /sɯm+i+mas+eN/ 'not be settled, not be over' in casual speech and that it is now stored as a lexical item in itself (i.e. /sɯimaseN/ 'excuse me, I am sorry'). [sɯimaseN], therefore, is a case of lexicalisation, and (1a) should be rewritten as follows:

(4) Lexicalisation of /sɯm+i+mas+eN/

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | sɯm+i+mas+eN | sɯmimaseN | n/a | 'excuse me, I am sorry'[8] |
| b. | sɯimaseN | n/a | sɯimaseN | 'excuse me, I am sorry' |
| cf. | sɯm+i+mas+eN | sɯmimaseN | sɯmimaseN | 'not be settled, not be over' |

[7] /totemo/ is usually realised as [tottemo] in casual speech when expressed in an emphatic way. For in-depth discussion on emphatic expressions, see Chapter 8.

[8] In casual speech [sɯmimaseN] 'excuse me, I am sorry' may still be heard. In such a case, we should assume that its underlying representation is /sɯm+i+mas+eN/.

Here is another puzzle to solve in relation to /sɯm+i+mas+eN/ → /sɯimaseN/ → [sɯimaseN] 'excuse me, I am sorry'. If the deletion of the root-final labial was due to the combination of frequency effects and underpronunciation of labials, why did the labial in the polite morpheme /mas/ survive? The answer is as follows: in Japanese, the first consonant of a morpheme almost never drops regardless of the formality of speech. The motivation for this is the necessity to clearly indicate where within a word or a phrase each morpheme starts for the sake of speech perception.[9] This can be formulated as follows:

(5) Constraint 29

**MAX$_{\text{INIT}}$-C-IO**: No deletion of the leftmost consonant of a morpheme (Kawai 2003a, 2003b).[10]

This positional faithfulness constraint outranks *LAB so that a labial is not deleted when it is the first consonant of a morpheme, whether the morpheme is an open-class item or a closed-class item, as seen in the polite morpheme /mas/ → [mas]. MAX$_{\text{INIT}}$-C-IO, however, cannot be an undominated constraint because in casual speech a conditional morpheme /eba/ 'if' surfaces as [$^j$a] (e.g. /tob+eba/ → [tob$^j$a] 'if fly/jump'; see Chapter 6, 6.5 for in-depth discussion).[11] In regard to its place in the constraint hierarchy, I assume that it is ranked in the same stratum as MAX-IO(Open), thus:

(6) Constraint ranking 17

MAX-IO(Open), MAX$_{\text{INIT}}$-C-IO >> *LAB

[9] This notion is well supported in studies of word recognition. See Horowitz, et al. (1968), Nooteboom (1981) and Cutler, et al. (1985:736-737), among others.

[10] When the initial syllable of a morpheme lacks an onset, the leftmost consonant is the first consonant from the left edge of the morpheme. It may be the onset of the second or third syllable (e.g. /t/ in /ɯti/ 'house', /d/ in /aida/ 'interval'), or the coda of the initial syllable (the first /t/ in /otto/ 'husband'). In Japanese the initial segment of a morpheme can drop, as seen in /te#ik+ɯ/ → [tekɯ] '(do) gradually' (see Chapter 3, 3.3), so '-C' is needed for this constraint.

[11] The other cases that I can think of where the leftmost consonant of a morpheme appears to be deleted are the topic/contrast marker /wa/ → [a], as seen in (1b) (see the next subsection as well as Chapter 5, 5.5.3 for further discussion) and a first person singular pronoun /watasi/ → [ataʃi] 'I, me' (probably due to lexicalisation; [ataʃi] implies informalness). In both cases the deleted consonants are labials in closed-class items.

### 4.2.2 Topic/Contrast Marker /wa/

The topic/contrast marker /wa/ undergoes a contraction process with the preceding closed-class item when the latter ends in a front vowel, as seen in (1b) and the following:[12]

(7) Contraction of /e#wa/ and /i#wa/ to /ja/ in casual speech[13]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | te#wa | tewa / dewa | tʃa / dʒa | *te*-form + /wa/ |
| b. | de#wa | dewa | dʒa | particle /de/ + /wa/ |
| c. | de#wa#na+i | dewanai | dʒanai | 'be not' (copula /de/ + /wa/) |
| d. | ni#wa | niwa | ɲa | particle /ni/ + /wa/ |
| e. | watasi#wa | wataʃiwa | wataʃa | 'I (TOPIC)' |

From a derivational theoretical point of view, this contraction can be accounted for as follows:

(8) Derivational theoretical analysis of contraction of /te#wa/, /de#wa/ and /de#wa#na+i/[14]

| | /te#wa/ | /de#wa/ | /de#wa#na+i/ |
|---|---|---|---|
| labial deletion | tea | dea | deanai |
| glide formation | tja | dja | djanai |
| assibilation | [tʃa] | [dʒa] | [dʒanai] |

Here are some statistical data on the contraction involving /wa/ from my Master's thesis (1995):

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[12] /wa/ also undergoes contraction in casual speech when preceded by a closed-class item with a final back vowel, as in /bokɯ#wa/ → [boka] 'I (TOPIC)' (Gokô 1979:24-25, Shibatani 1990:176).

Shibatani (ibid.) argues that open-class items can undergo contraction with /wa/ (e.g. /tori#wa/ → [torʲa] 'bird (TOPIC)'), but such contraction was not even once observed in the data I collected in 1993-1994 and 2001. (Miyara (1980:101) also dismisses this kind of contraction.) This is because **ALIGN-R(Open)** militates against the glide formation at the right edge of an open-class item. See Chapter 5, 5.5.3 for discussion on this constraint.

[13] The process in question often involves compensatory lengthening. See Chapter 6 for in-depth discussion on compensatory lengthening in Japanese.

[14] In accounting for the contraction of _site#wa_ 'do-CONJ TOP' and _jonde#wa_ 'read-CONJ TOP', Shibatani (1990:176) employs j-epenthesis and e-deletion instead of glide formation. However, I opt for glide formation in my analysis, following Miyara's (1980:107-111) analysis of the contraction of /kereba/ → [kʲa] 'if', for the reason that glide formation is a cross-linguistically common process, which is observed in such languages as Greek (Fukuda 1985:4), Ilokano (Hayes 1989:269-279) LuGanda (Clements 1986:47-48) and Spanish (Takahashi 1967:18-19).

(9) Occurrence and realisation of (7a-c) according to the degree of formality[15, 16]

| /te#wa/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [tewa / dewa] | 4 | (40%) | 2 | (29%) | 0 | (0%) | 6 | (9%) |
| [tʃa / dʒa] | 6 | (60%) | 5 | (71%) | 47 | (100%) | 58 | (91%) |
| Total | 10 | (100%) | 7 | (100%) | 47 | (100%) | 64 | (100%) |

| /de#wa/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [dewa] | 9 | (69%) | 5 | (21%) | 3 | (8%) | 17 | (23%) |
| [dʒa] | 4 | (31%) | 19 | (79%) | 34 | (92%) | 57 | (77%) |
| Total | 13 | (100%) | 24 | (100%) | 37 | (100%) | 74 | (100%) |

| /de#wa#na+i/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [dewanai] | 21 | (28%) | 7 | (7%) | 1 | (1%) | 29 | (8%) |
| [dʒanai] | 54 | (72%) | 93 | (93%) | 172 | (99%) | 319 | (92%) |
| Total | 75 | (100%) | 100 | (100%) | 173 | (100%) | 348 | (100%) |

As the data clearly show, in casual speech, the reduced forms are almost exclusively used. However, if MAX$_{\mathrm{INIT}}$-C-IO dominates *LAB, why can /w/ be deleted from /wa/? It is very likely that, just like [sɯimaseN] 'excuse me, I am sorry', this was diachronically caused by the combination of frequency effects and underpronunciation of labials. Unarguably, /wa/ is one of the most common particles (according to the National Institute of Japanese Language (1962), it is the third most frequently used particle, after /no/, which indicates the genitive case, and /ni/, which indicates the dative and the locative case among others), and its frequent use appears to be the driving force behind the deletion of the initial /w/.

The domination of *LAB by MAX$_{\mathrm{INIT}}$-C-IO and MAX-IO(Open) means that, under ordinary circumstances, labials always surface when they are the leftmost consonants of morphemes and are never deleted from open-class items, with the exception of root-final /w/ followed by a non-low vowel due to undominated *wV[-low]. However, it looks as if there were cases in which a labial protected by a high-ranking constraint is deleted in casual speech, and w-deletion from /wa/ when preceded by a closed-class item appears to

[15] Maekawa (2002) reports that the contraction of copula /de/ + /wa/ is much more frequent than that of particle /de/ + /wa/. The results of my survey also show this tendency, although the difference between them is not as prominent as that of Maekawa's.

[16] It seems that it is completely up to the speaker as to when a shift from formal speech to casual speech takes place; for some the shift may start even in a situation which is considered as formal or semi-formal by others.

be one example. Should we ascribe this w-deletion to frequency effects and treat it as an isolated case? We will revisit the contraction of closed-class items with /wa/ in Chapter 5, 5.5.3, where it will be argued that /w/ in /wa/ is a ghost segment in casual speech.

### 4.3 RERANKING OF CONSTRAINTS IN CASUAL SPEECH

When /simaw+ɯ/ is used as a full verb meaning 'put away', contraction never takes place due to MAX-IO(Open). However, when used as an auxiliary verb meaning 'end up –ing', it often undergoes a contraction process with the preceding *te*-from (see (1c)) even in formal speech, and in casual speech the contracted form is almost exclusively used. Here are some statistical data, again, from my Master's thesis (1995).

(10) Occurrence and realisation of /te#simaw+ɯ/ 'end up –ing' according to the degree of formality[17]

| /te#simaw+ɯ/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [teʃimaɯ / deʃimaɯ] | 8 | (44%) | 20 | (24%) | 8 | (5%) | 36 | (14%) |
| [tʃaɯ / dʒaɯ] | 10 | (56%) | 62 | (76%) | 151 | (95%) | 223 | (86%) |
| Total | 18 | (100%) | 82 | (100%) | 159 | (100%) | 259 | (100%) |

We have established the following constraint ranking for formal speech in Chapters 2 and 3:

(11) Constraint ranking for formal speech[18]

CODACOND, CVLINKAGE(I), M-PARSE(tense), MAX-V-IO, *wV[-low]
>>
IDENT-ONSET-IO(place)
>>
IDENT-IO(place), MAX-C-IO
>>
IDENT-IO(anterior), ONSET
>>
*i >> *ɯ >> *e >> *o >> *a

[17] When the root-final consonant of a verb is /b/, /m/, /n/ or /g/, /te/ surfaces as [de]. See Chapter 2, 2.3 for the formation of the *te*-form.

[18] Constraints that are not required to account for the contraction of /te#simaw+ɯ/ 'end up –ing' are omitted.

Let us confirm that this constraint ranking selects [teʃimaɯ] as the optimal candidate for /te#simaw+ɯ/ 'end up –ing' in formal speech. (Low-ranking constraints are omitted from the following tableau.)

(12) Tableau for /te#simaw+ɯ/ 'end up –ing' in formal speech[19]

| Input: /te#simaw+ɯ/ | CV LINK | CODA COND | M-PARSE (tense) | MAX -V | *wV [-low] | ID-ONS (place) | ID (pl) | MAX -C |
|---|---|---|---|---|---|---|---|---|
| a. tʃaɯ | | | | *! | | | | ** |
| b. tʃimaɯ | | | | *! | | | | * |
| c. ☞ teʃimaɯ | | | | | | | | * |
| d. teʃiaɯ | | | | | | | | **! |
| e. teʃinaɯ | | | | | | *! | * | * |
| f. teʃimajɯ | | | | | | *! | * | |
| g. tʃawɯ | | | | *! | * | | | * |
| h. teʃima | | | *! | * | | | | * |
| i. tʃa | | | *! | ** | | | | ** |
| j tʃaw | | *! | * | ** | | | | * |
| k. tesimawɯ | *! | | | | * | | | |

The candidate most faithful to the underlying representation (12k) is eliminated due to CVLINKAGE(I) and *wV[-low] violations, and the candidate that satisfies the undominated constraints at the expense of a violation of MAX-C-IO as well as those of lower-ranking constraints (e.g. IDENT-IO(anterior), ONSET) (12c), which is the actual output, is correctly selected as optimal. In casual speech, on the other hand, [tʃaɯ] (12a) is the actual output so we expect reranking of constraints to take place. In the previous chapter, we established ONSET >> MAX-V-IO in casual speech to account for the syncope in the *te*-form followed by vowel-initial auxiliary verbs. In the contraction process of /te#simaw+ɯ/ to [tʃaɯ] 'end up –ing', the demotion of MAX-V-IO below ONSET can account for e-deletion[20] but

[19] Note the number of violation marks in the MAX-V-IO column. I consider /si/ → [ʃ] (via /sj/) as glide formation, in which the /i/ features move into the onset /s/, and that /i/ is not deleted at the surface level. According to Hayes (1989:277), an identical process was observed in Old English (e.g. /pasiəns/ → [pa:ʃəns] (Modern English [peiʃəns] 'patience')).

[20] Japanese allows coronal affricates and palatalised consonants as licit onsets (see Chapter 3, 3.3). Therefore, the deletion of /e/ between /t/ and /s/ does not create a consonant cluster that cannot be parsed. In fact, [tʃimaɯ] (12b) can be occasionally heard in casual male speech. See 4.7 for discussion on this.

not for m-deletion, which indicates that further reranking of constraints is required. /te#simaw+ɯ/ → [tʃaɯ] is a clear case of consonant deletion so MAX-C-IO must be ranked lower than at least *LAB, but the question is how far it needs to be demoted in casual speech. Let us suppose that it is ranked together with MAX-V-IO below the *V subhierarchy, and put /kɯdasaɾ/ to the test. /kɯdasaɾ/ can be used as a full verb meaning 'give (me) (RESPECTFUL)' and as an auxiliary verb meaning 'do (me) the favour of –ing (RESPECTFUL)'. When used as a full verb, it should surface as it is because every segment is protected by MAX-IO(Open), but what will happen to it when used as an auxiliary verb?

(13) Tableau for /te#kɯdasaɾ+ɯ/ 'do (me) the favour of –ing (RESPECTFUL)' in casual speech[21]

| Input: /te#kɯdasaɾ+ɯ/ | M-PARSE (tense) | $\text{MAX}_{\text{INIT}}$-C-IO | ONSET | *ɯ | *e | *a | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|---|---|
| a. tekɯdasaɾɯ | | | | **! | * | ** | | |
| b. ☹ tekɯ | | | | * | * | | *** | *** |
| c. tekaɾɯ | | | | * | * | *! | ** | ** |
| d. tekasaɾɯ | | | | * | * | *!* | * | * |
| e. tekɯdaɾɯ | | | | **! | * | *! | * | * |
| f. tekɯaɾɯ | | | *! | ** | * | * | ** | * |
| g. kɯ | | *! | | * | | | **** | **** |
| h. teka | *! | | | | * | * | *** | *** |

Although the actual output is [tekɯdasaɾɯ] (13a), *[tekɯ] (13b) is incorrectly selected as optimal because its violations of the *V constraints are minimal. If MAX-C-IO is ranked below the *V subhierarchy, unprotected consonants, such as /d/, /s/ and /ɾ/ in /kɯdasaɾ/ 'give (me) the favour of –ing (RESPECTFUL)', will be wiped out together with their neighbouring vowels. Therefore, in order to avoid this kind of random consonant deletion, we must rank MAX-C-IO above the *V subhierarchy. Let us redraw a tableau for /te#kɯdasaɾ+ɯ/ 'do (me) the favour of –ing (RESPECTFUL)' for casual speech, this time with the order of *V constraints and MAX-C-IO being reversed.

[21] Candidates that violate CODACOND (e.g. *[tekɾɯ]) or *COMPLEX (e.g. *[tkɯ]) are omitted from the tableau.

(14) Tableau for /te#kɯdasaɾ+ɯ/ 'give (me) the favour of –ing (RESPECTFUL)' in casual speech (revised)

| Input: /te#kɯdasaɾ+ɯ/ | M-PARSE (tense) | $\text{MAX}_{\text{INIT}}$-C-IO | ONSET | MAX-C-IO | *ɯ | *e | *a | MAX-V-IO |
|---|---|---|---|---|---|---|---|---|
| a. ☞ tekɯdasaɾɯ | | | | | ** | * | ** | |
| b. tekɯ | | | | *!** | * | * | | *** |
| c. tekaɾɯ | | | | *!* | * | * | * | ** |
| d. tekasaɾɯ | | | | *! | * | * | ** | * |
| e. tekɯdaɾɯ | | | | *! | ** | * | *! | * |
| f. tekɯaɾɯ | | | *! | ** | ** | * | * | * |
| g. kɯ | | *! | | **** | * | | | **** |
| h. teka | *! | | | *** | | * | * | *** |

In 4.2.1 we established MAX-IO(Open), $\text{MAX}_{\text{INIT}}$-C-IO >> *LAB. In casual speech, *LAB must dominate MAX-C-IO so that labial deletion can take place in /te#simaw+ɯ/ 'end up –ing', /keɾedomo/ 'although', /keɾeba/ 'if' and so forth. I thus rank *LAB between ONSET and MAX-C-IO.[22] This yields the following constraint rankings:

(15) Constraint rankings 18

a. Formal speech

CODACOND, CVLINKAGE(I),
M-PARSE(tense), *wV[-low],
**MAX-V-IO**
>>
IDENT-ONSET-IO(place)
>>
IDENT-IO(place), MAX-IO(Open),
$\text{MAX}_{\text{INIT}}$-C-IO, **MAX-C-IO**
>>
IDENT-IO(anterior), ONSET
>>
*LAB
>>
*i >> *ɯ >> *e >> *o >> *a

b. Casual speech

CODACOND, CVLINKAGE(I),
M-PARSE(tense), *wV[-low]
>>
IDENT-ONSET-IO(place)
>>
IDENT-IO(place), MAX-IO(Open),
$\text{MAX}_{\text{INIT}}$-C-IO
>>
IDENT-IO(anterior), ONSET
>>
*LAB
>>
**MAX-C-IO**
>>
*i >> *ɯ >> *e >> *o >> *a
>>
**MAX-V-IO**

[22] The reason why *LAB should be ranked lower than ONSET will become apparent in Chapter 5, 5.5.3 when **ALIGN-R(Open)** is introduced.

In casual speech the full verb /simaw+ɯ/ 'put away' and /te#simaw+ɯ/ 'end up –ing' surface as [ʃimaɯ] and [tʃaɯ], respectively. Let us see if the constraint ranking (15b) can correctly select the actual outputs, [ʃimaɯ] and [tʃaɯ]. (Candidates that violate undominated constraints are omitted together with such constraints, as well as some low-ranking constraints, from Tableaux (16-17).)

(16) Tableau for /simaw+ɯ/ 'put away' in casual speech

| Input: /simaw+ɯ/ | IDENT-ONSET -IO(place) | IDENT-IO (place) | MAX-IO (Open) | ONSET | *LAB | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ ʃimaɯ | | | * | * | * | * | |
| b. ʃaɯ | | | **! | * | | ** | |
| c. ʃiaɯ | | | **! | ** | | ** | |
| d. saɯ | | | **!* | * | | ** | * |
| e. ʃimajɯ | *! | * | | | * | | |
| f. ʃinaɯ | *! | * | * | * | | * | |

(17) Tableau for /te#simaw+ɯ/ 'end up –ing' in casual speech[23]

| Input: /te#simaw+ɯ/ | IDENT-ONSET -IO(place) | IDENT-IO (place) | ONSET | *LAB | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ tʃaɯ | | | * | | ** | * |
| b. tʃimaɯ | | | * | *! | * | * |
| c. teʃimaɯ | | | * | *! | * | |
| d. tʃajɯ | *! | * | | | * | * |
| e. tʃinaɯ | *! | * | * | | * | * |

In both tableaux the actual outputs are correctly selected. Next let us put /te#simaw+i+mas+ɯ/[24], the polite counterpart of /te#simaw+ɯ/ 'end up –ing, to the test. (Candidates that violate undominated constraints are omitted together with such constraints, as well as some low-ranking constraints, from Tableau (18).)

[23] *[tsaɯ] is another possible candidate but, because [ts] is not a permissible consonant cluster in Yamato vocabulary unless followed by [ɯ], *[tsaɯ] will never be optimal. ([otottsaN] 'father' (Block 1950:146-147) may be heard in some dialects but is not in common use.)

[24] I do not consider /i+mas/ as a monomorphemic /imas/, which is on a par with Suzuki (1972:265) and Shirota (1998:7) among others. Some morphologists may argue that there is no formative boundary between /i/ and /mas/. Even if we accept that, it does not affect our OT analysis because /m/ is still the leftmost consonant of the polite morpheme.

(18) Tableau for /te#simaw+i+mas+ɯ/ 'end up –ing (POLITE)' in casual speech[25]

| Input: /te#simaw +i+mas+ɯ/ | IDENT-ONS -IO(place) | IDENT-IO (place) | MAX$_{\text{INIT}}$ -C-IO | ONS | *LAB | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. tʃaimasɯ | | | | *! | * | ** | * |
| b. tʃimaimasɯ | | | | *! | ** | * | * |
| c. teʃimaimasɯ | | | | *! | ** | * | |
| d. tʃawasɯ | | | *! | | * | ** | ** |
| e. tʃainasɯ | *! | * | | * | | ** | * |
| f. ☹ tʃamasɯ | | | | | * | ** | ** |

The actual output is [tʃaimasɯ] (18a) but our constraint ranking incorrectly selects *[tʃamasɯ] (18f) because the latter does not violate ONSET. In fact, the polite non-past affirmative form of any full /w/-final root verb will never be selected as optimal either with our current constraint hierarchy. For instance:

(19) Tableau for /kaw+i+mas+ɯ/ 'buy (POLITE)' in casual speech[26]

| Input: /kaw+i+ mas+ɯ/ | MAX-IO (Open) | MAX$_{\text{INIT}}$ -C-IO | ANCHOR-IO(Open) | ONSET | *LAB | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. kaimasɯ | * | | *! | * | * | * | |
| b. ☹ kawasɯ | | * | | | * | * | * |
| c. kamasɯ | * | | *! | | * | * | * |

In this tableau the actual output (19a) fares worse than a candidate with /i+m/ deletion (19b) as well as a candidate with /w+i/ deletion (19c). None of the constraints in our current constraint hierarchy can eliminate these unwanted candidates before the actual candidate is ruled out, so we need a constraint which at least dominates ANCHOR-IO(Open) but what can it be? The difference between the actual output (19a) and the unwanted candidates (19b-c) is that the latter involve deletion of segments on both sides of a morpheme boundary while the former involves deletion of only one segment. It is likely

[25] We cannot ascribe the non-deletion of the suffix /i/ from /te#simaw+i+mas+ɯ/ to REALISE-M (Itô & Mester 1998, 2003), because in casual speech the deletion of the suffix in question can be observed in such words as /jom+i+mas+ɯ/ → [jommasɯ] 'read (POLITE)'. (Also see (21c-d) below.)

[26] Candidates that violate undominated constraints (e.g. *[kawimasɯ], *[kawmasɯ]) are omitted from the tableau.

that there is a constraint that militates against deletion of more than one segment at a morpheme boundary. I thus formulate this constraint as follows:

(20) Constraint 30

**ALIGN-SFX**$^2$: No deletion/insertion of more than one segment at a boundary between a suffix and a morpheme that directly precedes.[27]

Deletion of one segment at a root-suffix boundary is well attested in both formal and casual speech in Japanese.

(21) Deletion of one segment at a root-suffix boundary

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kaw#ɯ | kaɯ | kaɯ | 'buy' (see Chapter 2) |
| b. | tabe+te#i+ɾɯ | tabeteiɾɯ | tabeteɾɯ | 'be eating' (see Chapter 3) |
| c. | kaeɾ+ana+i | kaeɾanai | kaennai | 'not return' (see Chapter 5) |
| d. | ik+i#kata | ikikata | ikkata | 'way of living' |
| e. | joɾ+i#kakaɾ+ɯ[28] | joɾikakaɾɯ | jokkakaɾɯ | 'lean' |

However, deletion of more than one segment at a boundary between a suffix and another item is never observed in Modern Japanese. This is because, if such deletion takes place, it will obscure the relationship between the two items and will simply cause the listener a problem with word recognition. Let us add ALIGN-SFX$^2$, which I assume is undominated, to Tableaux (18) and (19) to confirm that this time the actual outputs are selected correctly.

(22) Tableau for /te#simaw+i+mas+ɯ/ 'end up –ing (POLITE)' in casual speech (revised)

| Input: /te#simaw +i+mas+ɯ/ | ALIGN -SFX$^2$ | IDENT-ONS (place) | IDENT (place) | MAX $_{\text{INIT}}$-C | ONS | *LAB | MAX -C | MAX -V |
|---|---|---|---|---|---|---|---|---|
| a. ☞ tʃaimasɯ | | | | | * | * | ** | * |
| b. tʃimaimasɯ | | | | | * | **! | * | * |
| c. teʃimaimasɯ | | | | | * | **! | * | |
| d. tʃawasɯ | *! | | | * | | * | ** | ** |
| e. tʃainasɯ | | *! | * | | * | | ** | * |
| f. tʃamasɯ | *! | | | | | * | ** | ** |

[27] This constraint is self-conjunction of **ALIGN-SFX** (McCarthy & Prince 1994a).

[28] Poser (1986:172) considers the /i/ between two verb roots in a compound verb to be epenthetic.

(23) Tableau for /kaw+i+mas+ɯ/ 'buy (POLITE)' in casual speech (revised)

| Input: /kaw+i+ mas+ɯ/ | ALIGN -SFX[2] | MAX-IO (Open) | $\text{MAX}_{\text{INIT}}$ -C-IO | ANCHOR-IO(Open) | ONS | *LAB | MAX -C | MAX -V |
|---|---|---|---|---|---|---|---|---|
| a. ☞ kaimasɯ | | * | | * | * | * | * | |
| b. kawasɯ | *! | | * | | | * | * | * |
| c. kamasɯ | *! | * | | * | | * | * | * |

In this section we have examined the contraction of /te#simaw+ɯ/ from the point of view of constraint reranking and have shown that, in order to account for the contraction in question, all we need to do is to simply demote MAX-C-IO below *LAB in addition to MAX-V-IO below the *V subhierarchy. In the following section, we will discuss another marked segment in Japanese: the flap.

### 4.4 AVOIDANCE OF FLAPS

In Japanese, there seems to have been a tendency to avoid flaps. The following are some such examples observed in Classical Japanese and Modern Japanese:

(24) Avoidance of flaps in Classical Japanese (Kishida 1984)[29]

| | Surface | Contracted | Gloss |
|---|---|---|---|
| a. | kenaɾiŋe | kenaŋe | 'brave' |
| b. | naɾetsɯkɯ | natsɯkɯ | 'get used' |
| c. | saɾaba | saba | 'if so' |
| d. | odoɾokasɯ | odokasɯ | 'surprise' |
| e. | aɾɯmeɾi | ammeɾi | 'there seems' |

(25) Avoidance of flaps in casual speech of Modern Japanese

| | Underlying | Surface | Contracted | Gloss |
|---|---|---|---|---|
| a. | kosiɾae+ɾɯ | koʃiɾaeɾɯ | kosaeɾɯ | 'produce' |
| b. | tokoɾo | tokoɾo | toko | 'place (n.)'[30] |
| c. | iɾo+RED+na | iɾoiɾona | iɾonna | 'various' |
| d. | oki+ɾaɾe+ɾɯ | okiɾaɾeɾɯ | okiɾeɾɯ | 'can get up' |
| e. | wakaɾ+ana+i | wakaɾanai | wakannai | 'not know, not understand' |

[29] The phonetic transcription is based on Modern Japanese.
[30] There are single-morpheme open-class items that are phonotactically similar to /tokoɾo/, such as /kokoɾo/ 'heart' and /takaɾa/ 'treasure', but only /tokoɾo/ appears to go through contraction.

Let us examine (25a-e) in a little more detail. Both /kosiɾae/ 'produce' (25a) and /tokoɾo/ 'place' (25b) are open-class items so that deletion of any segment from these words should be prohibited at least by MAX-IO(Open), as the following combined tableau shows:

(26) Combined tableau for /kosiɾae+ɾɯ/ 'produce' and /tokoɾo/ 'place' in casual speech

| Input: | | CONTIG (Open) | MAX (Open) | ANCHOR (Open) | IDENT (ant) | MAX -C | MAX -V |
|---|---|---|---|---|---|---|---|
| /kosiɾae+ɾɯ/ | a. ☹ koʃiɾaeɾɯ | | | | * | | |
| | b. kosaeɾɯ | *!* | ** | | | * | * |
| /tokoɾo/ | c. ☹ tokoɾo | | | | | | |
| | d. toko | | *!* | ** | | * | * |

How, then, should we account for the reduction observed in (25a) and (25b)? According to the National Institute of Japanese Language (1962), /tokoɾo/ 'place' is the 50th most frequently used word in Japanese, thus we could consider that the reduction of /tokoɾo/ to [toko] is due to the combination of frequency effects and avoidance of flaps. In fact, my own survey in 1993-1994 confirms one of the arguments made by Bybee (2001:59) — familiar, and thus high-frequency, words tend to be used in familiar social settings, where there are fewer restrictions on reduction. /tokoɾo/ 'place' was observed 50 times in the data I gathered; in casual speech 15 out of 28 times (54%) it was realised as [toko], while in formal speech not even once was it reduced to [toko]. My interpretation of [tokoɾo]~[toko] alternation, however, is as follows: there are two underlying representations for this word, one for formal speech (i.e. /tokoɾo/) and the other for casual speech (i.e /toko/); some possess both while others only possess /tokoɾo/, and this explains why some people use [tokoɾo] even in casual speech.

/kosiɾae/ 'produce', on the other hand, is not a high-frequency word and by no means can we invoke frequency effects to account for [koʃiɾae]~[kosae] alternation. Also, unlike [tokoɾo]~[toko] alternation, it is not the case that [koʃiɾae] is used in formal speech and [kosae] in casual speech. The difference between the use of [toko] and that of [kosae], however, is that those who use [toko] are aware that its unreduced form is [tokoɾo] but that those who use [kosae] do not seem to realise that they are contracting the word. This assumption is based on the results of my search on the Internet in July 2003.[31]

(27) Occurrence of [koʃiɾae] and [kosae] on the Internet

| | [koʃiɾae] | [kosae] | Total |
|---|---|---|---|
| Plain non-past aff. [+ɾɯ] | approx. 5090 (70%) | approx. 2200 (30%) | approx. 7290 (100%) |
| Plain non-past neg. [+nai] | 124 (52%) | 115 (48%) | 239 (100%) |
| Plain past aff. [+ta] | approx. 9210 (69%) | approx. 4070 (31%) | approx. 13280 (100%) |
| Plain past neg. [+nakatta] | 12 (55%) | 10 (45%) | 22 (100%) |
| Polite non-past aff. [+masɯ] | 362 (72%) | 141 (28%) | 503 (100%) |
| Polite non-past neg. [+maseN] | 8 (62%) | 5 (38%) | 13 (100%) |
| Polite past aff. [+maʃita] | approx. 1220 (68%) | 585 (32%) | approx. 1805 (100%) |
| Polite past neg. [+masendeʃita] | 5 (100%) | 0 (0%) | 5 (100%) |
| *Te*-form [+te] | approx. 10500 (61%) | approx. 6780 (39%) | approx. 17280 (100%) |
| Total | approx. 26531 (66%) | approx. 13906 (34%) | approx. 40437 (100%) |

Regardless of the degree of formality, some use [koʃiɾae] and others use [kosae]. Thus, I consider that (25a) is a case of lexicalisation (e.g. /kosae+ɾɯ/ → [kosaeɾɯ]) for those who use [kosae] and that approximately one third of all the speakers of the language now have /kosae/ as its underlying representation. Yet, I consider that the driving force behind this lexicalisation is avoidance of flaps.

/iɾo+RED+na/ 'various' (25c) involves reduplication. Reduplication is commonly observed among plural nouns, adjectives and adverbs in Japanese. Here are some more examples of reduplication with a flap in the base:

(28) Reduplication in Japanese

| | Underlying | Surface | Contracted | Gloss |
|---|---|---|---|---|
| a. | gaɾi+RED | gaɾigaɾi | n/a | 'making a scratching sound' |
| b. | kɯɾɯ+RED | kɯɾɯkɯɾɯ | n/a | 'round and round' |
| c. | soɾe+RED#ni | soɾezoɾeni | n/a | 'to each, for each' |
| d. | oɾi+RED#no | oɾioɾino | n/a | 'occasional' |

In the process of reduplication in Japanese, both **MAX-BR** (McCarthy & Prince 1994a, 1994b) and **IDENT-BR** (ibid.) are high-ranking and the reduplicant is required to be as

[31] I utilised the search engine of www.yahoo.co.jp.

faithful as possible to the base, and that is why neither VVN (voiced velar nasalisation) nor sequential voicing applies to reduplicants in Mimetic vocabulary, as seen in (28a-b) (e.g. *[gariŋari], *[kɯɾɯgɯɾɯ]). In (28c-d) the fourth vowel is never deleted nor is the second flap nasalised, so [soɾezoɾeni] 'respective' and [oɾioɾino] 'occasional' are definitely not contracted to *[soɾezonni] and *[orionno], respectively, in any register of speech. Why, then, is /iɾo+RED+na/ 'various' (25c) contracted to [iɾonna]? According to the National Institute of Japanese Language (1962), it is the 281st most frequently used word and the most frequently used reduplicated word in Japanese, so we could conclude that this is another case of frequency effects in conjunction with avoidance of flaps. My conclusion, however, is that, just like [tokoɾo] and [toko], [iɾoiɾona] and [iɾonna] simply do not share the same underlying representation (i.e. /iɾo+RED+na/ for [iɾoiɾona]; /iɾonna/ for [iɾonna]); /iɾo+RED+na/ mainly used in formal writing and /iɾonna/ for all the other occasions. This is based on the fact that, unlike [koʃiɾae]~[kosae], both [iɾoiɾona] and [iɾonna] are used by any one speaker but that [iɾonna] is almost exclusively used in speech regardless of formality of speech.[32]

Forms like (25d) called *ranuki kotoba* (word without *ra*) or the short form, which is the potential form without /ɾ/ and /a/, are frequently observed nowadays both in speech and in writing. The contraction of /ɾaɾe/ to [ɾe] started to appear early in the *Showa* period (1926-1989) and quickly spread in the second half of the same period (Tsukishima 1988:111). In some dialects (Nagoya dialect, for one) this contraction is now applicable to the potential form of any vowel-final root verb, but in standard Japanese the potential form does not seem to be contracted readily if the root has more than two moras. Since the speakers of standard Japanese who use the contracted potential form do not contract the passive form despite its underlying representation being identical to that of the potential form,[33] I assume that such speakers possess two distinct underlying potential morphemes

[32] In my 1993-1994 survey, [iɾonna] was observed 15 times (83%) and [iɾoiɾona] 3 times (17%). This ratio was more or less the same across all three registers of speech.

[33] This is probably due to the more common use of the potential form than that of the passive form.

Back in 1994 I gave a little quiz to native Japanese speakers of around 20 years of age who were attending my Japanese classes. I asked them to write the potential form and the passive form of [kɯɾɯ] 'come' and all ten of them wrote [koɾeɾɯ] for potential and [koɾaɾeɾɯ] for passive, although the correct answers are both for vowel-final root verbs: /ɾe/ for monomoraic and bimoraic roots and /ɾaɾe/ for roots with more than two moras, as exemplified below.

(29) Potential morphemes for the speakers who use the contracted potential form

a. For monomoraic and bimoraic roots: /ɾe/

| | | | | |
|---|---|---|---|---|
| e.g. | /mi+ɾe+ɾɯ/ | → | [miɾeɾɯ] | 'can see/watch' |
| | /tabe+ɾe+ɾɯ/ | → | [tabeɾeɾɯ] | 'can eat' |
| cf. | /mi+ɾaɾe+ɾɯ/ | → | [miɾaɾeɾɯ] | 'be seen/watched' |
| | /tabe+ɾaɾe+ɾɯ/ | → | [tabeɾaɾeɾɯ] | 'be eaten' |

b. For three or more mora roots: /ɾaɾe/

| | | | | |
|---|---|---|---|---|
| e.g. | /wasɯɾe+ɾaɾe+ɾɯ/ | → | [wasɯɾeɾaɾeɾɯ] | 'can forget' |
| | /kaNgae+ɾaɾe+ɾɯ/ | → | [kaŋŋaeɾaɾeɾɯ] | 'can think' |

It is likely that the deletion of /ɾ/ and /a/ from the potential form was originally due to haplology and avoidance of flaps, and that the reason why shorter-root verbs underwent contraction more readily than longer-root verbs was that there are more words that are frequently used in the former group of verbs than in the latter.

(30) No. of vowel-final verbs found in the frequency ranking (from the National Institute of Japanese Language 1962)[34]

| No. of mora in root | No. of vowel-final verbs in frequency ranking | | | | | | | | | | Sub-total | Total No. of entries in the ranking |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~100 | ~200 | ~300 | ~400 | ~500 | ~600 | ~700 | ~800 | ~900 | ~1000 | | |
| 1 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 7 |
| 2 | 1 | 3 | 2 | 2 | 2 | 0 | 3 | 3 | 3 | 2 | 21 | 70 |
| 3 | 0 | 0 | 2 | 1 | 5 | 2 | 2 | 5 | 3 | 1 | 21 | 86 |
| 4+ | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 61 |
| Total | 5 | 4 | 4 | 4 | 7 | 2 | 5 | 8 | 6 | 3 | 48 | 224 |

Frequency appeared to have played some role in determining the choice between /ɾe/ and /ɾaɾe/ when the contraction emerged, but it seems that the generalisation stated in (29) has

[koɾaɾeɾɯ]. This clearly indicates that, insofar as [kɯɾɯ] 'come' is concerned, they only have /ɾe/ as its underlying potential morpheme, and I believe that that is also the case with high-frequency monomoraic and bimoraic vowel-final root verbs, such as /mi/ 'watch, see', /ki/ 'put on, wear', /tabe/ 'eat', /oki/ 'get up' and so forth.

[34] Verbs that are never used in the potential form are excluded.

already been established because, whether a vowel-final monomoraic or bimoraic root is in frequent use or not, its reduced form sounds acceptable in most cases.

Flap nasalisation is another manifestation of avoidance of flaps, which was also observed in Classical Japanese (e.g. [arɯmeɾi] → [ammeɾi] 'there seems' (24e)). Unlike (25a-c), flap nasalisation is a systematic process, which the root-final /ɾ/ undergoes in casual speech when followed by /ana/ 'not' (25e), /i#nasa+i/ (command), /ɯ#no/ (question with a rising intonation; assertion with a falling intonation), and so forth, as seen below:

(31) Nasalisation of flaps in casual speech[35]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kaeɾ+ana+i | kaeɾanai | kaennai | 'not return' |
| b. | jaɾ+i#nasa+i | jaɾinasai | jannasai | 'do!' |
| c. | haiɾ+ɯ#no | haiɾɯno | hainno | 'enter?, will enter' |

Of the above three types of flap nasalisation, /ɾ+ana+i/ → [nnai] is observed the most commonly and, in casual speech, the contracted form is predominant, as the following table shows:

(32) Occurrence and realisation of /ɾ+ana+i/ 'not' according to the degree of formality[36]

| /ɾ+ana+i/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [ɾanai] | 2 | (67%) | 10 | (42%) | 4 | (17%) | 16 | (31%) |
| [nnai] | 1 | (33%) | 14 | (58%) | 20 | (83%) | 35 | (69%) |
| Total | 3 | (100%) | 24 | (100%) | 24 | (100%) | 51 | (100%) |

Being a systematic process frequently observed in casual speech, flap nasalisation deserves further investigation. Therefore, I will dedicate the next chapter solely to this flap nasalisation and attempt to account for part of it by invoking the concept of floating segments (Hyman 1985, Zoll 1993a, 1993b, 1994, 1996).

[35] Closely related is the contraction process of /ɾaɾe+na+i/ to [ɾannai] 'cannot (do), not be (done)', as seen in the potential and passive forms of vowel-final root verbs. See Chapter 5, 5.2.3 for in-depth discussion on this flap nasalisation.

[36] The reason why /ɾ+ana+i/ is not used as frequently in formal speech as in semi-formal or casual speech is that in formal speech /ɾ+i+mas+eN/, the polite counterpart of /ɾ+ana+i/ is preferred.

In this section we have examined a number of instances of flap avoidance observed in Modern Japanese in order to show that the flap is a marked segment. It is very likely that the contraction of (25a-d) was diachronically caused by overapplication of flap avoidance, but accounting for such alternations as [koʃirae]~[kosae] (25a), [tokoro]~[toko] (25b), [iroirona]~ [ironna] (25c) and [rare]~[re] (25d) should now be considered by positing two distinct underlying representations for each pair. This, however, does not necessarily mean that other contraction processes involving flap avoidance also need to be addressed from the same perspective. In the next section we will discuss how flap avoidance observed elsewhere should be dealt with within the framework of OT.

## 4.5 *ɾ

McCarthy & Prince (1995) propose ***ɾ** to account for an allophonic alternation between [d] and [ɾ] in Tagalog, in which the latter occurs intervocalically.

(33) Constraint 31

***ɾ**: No flaps (McCarthy & Prince 1995).

(34) *VdV >> *ɾ in Tagalog (McCarthy & Prince 1995:337)

| /ma-Dāmot/ 'stingy' | *VdV | *ɾ |
|---|---|---|
| a. ☞ maɾāmot | | * |
| b. madāmot | *! | |

| /Dāmot/ 'stinginess' | *VdV | *ɾ |
|---|---|---|
| c. ɾāmot | | *! |
| d. ☞ dāmot | | |

In Japanese both intervocalic [d] and word-initial [ɾ] are allowed, as the following minimal pairs show:[37]

(35) Minimal pairs with [d] / [ɾ] in Japanese

a. Intervocalic [d] / [ɾ]

sode 'sleeve' muɯda 'waste' kido 'wooden door'

[37] As discussed in Chapter 2, 2.2.4, a large number of native Japanese speakers actually use [l] for word-initial [ɾ]. However, when there is no pause between a word with initial /ɾ/ and the preceding word, /ɾ/ is always realised as a flap unless the preceding word ends in a moraic nasal, in which case it is realised as [l].

| | | | | | |
|---|---|---|---|---|---|
| soɾe | 'that one' | mɯɾa | 'unevenness' | kiɾo | 'way back' |

b. Word-initial [d] / [ɾ]

| | | | | | |
|---|---|---|---|---|---|
| deN | 'biography' | daN | 'step' | dokɯ | 'poison' |
| ɾeN | 'ream' | ɾaN | 'orchid' | ɾokɯ | 'six' |

Thus, *ɾ manifests itself in Japanese not in accounting for allophonic alternation, as seen in Tagalog, but through differences between formal and casual speech.[38]

Although there is a tendency to avoid flaps in casual speech, it is not the case that flaps can be deleted or assimilated to nasal in any environment. For instance, the flaps in (36a-b, e-g) never drop and those followed by a vowel and a nasal in (36c-d) never undergo nasalisation.

(36) Non-avoidance of flaps

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kaɾada | kaɾada | kaɾada | 'body' |
| b. | te#moɾaw+ɯ | temoɾaɯ | temoɾaɯ | 'receive the favour of –ing' |
| c. | taiɾa+na | taiɾana | taiɾana | 'flat' |
| d. | haɾe#naɾa | haɾenaɾa | haɾenaɾa | 'if the weather is good' |
| e. | mi#nagaɾa | minaŋaɾa | minaŋaɾa | 'while watching' |
| f. | watasi#joɾi | wataʃijoɾi | wataʃijoɾi | 'than me' |
| g. | so+ɾe#kɯrai | soɾekɯɾai | soɾekɯɾai | 'that much, to that extent' |

This is because (i) /kaɾada/ 'body' (36a) is a noun, which is an open-class item, and MAX-IO(Open) militates against deletion of the flap, (ii) although /moɾaw/ 'receive the favour of –ing' in (36b) is an auxiliary verb, it is a root (Japanese has some roots in closed class) and **MAX-IO(Root)** (see (37a) below) prevents the flap from being deleted, and (iii) both /taiɾa/ 'flat' in (36c) and /haɾe/ 'good weather' in (36d) are open-class items and, because their respective morpheme-final vowels cannot be deleted due to MAX-IO(Open), the nasalisation of the preceding flaps is prevented. How, then, can we account for non-

[38] In fact, even in Japanese the identical d~ɾ alternation can be observed in child phonology and in some dialects. However, the one observed in dialects differs from that of Tagalog in that some dialects show both ways of alternation (e.g. /deN+wa/ → [deɯ̃wa] 'telephone' and /ɾoɯ+sokɯ/ → [do:sokɯ] 'candle' in Shima and Okayama dialects; /ɯdoN/ → [ɯɾoN] 'noodles' and /kaɾada/ → [kadada] 'body' in Hida dialect (Kishida 1998:348-349)). For data on the alternation in child phonology, see Ueda & Davis (2001:113-114).

deletion of flaps from such particles as /naɾa/ 'if' in (36d), /nagaɾa/ 'while' in (36e), /joɾi/ 'than' in (36f) and /kɯɾai/ 'about, to ...extent' in (36g)?

In 4.2 and 4.3, we discussed the effects of $\text{MAX}_{\text{INIT}}$-C-IO. In Japanese the leftmost consonant of a morpheme is protected so that where within a word each morpheme starts can clearly be indicated. It seems that there is another positional faithfulness constraint that militates against deletion of the rightmost consonant of a morpheme, which I call **$\text{MAX}_{\text{FIN}}$-C-IO**. This constraint protects the flaps in /naɾa/, /nagaɾa/, /joɾi/ and /kɯɾai/.[39]

(37) Constraints 32

a. **MAX-IO(Root)**: No deletion of segments from roots (Kawai 2003b).

b. **$\text{MAX}_{\text{FIN}}$-C-IO**: No deletion of the rightmost consonant of a morpheme (ibid.).[40]

We now know from the above discussion that *ɾ is outranked by both constraints in (37) as well as MAX-IO(Open), so that flaps are not deleted from open-class items or from roots and are not deleted from closed-class items either when the flaps are the rightmost consonants of morphemes. On the other hand, as flaps do drop from some morphemes (see (1d-e)), MAX-C-IO must be dominated by *ɾ.

Where, then, is *LAB ranked in relation to MAX-IO(Root) and $\text{MAX}_{\text{FIN}}$-C-IO? The labial is deleted from /simaw/ when it is used as an auxiliary verb (e.g. /te#simaw+ɯ/ → [tʃaɯ] 'end up –ing) so MAX-IO(Root) is dominated by *LAB. Thus, we can establish the following rankings for casual speech:

(38) Constraint rankings 19

a. *LAB >> MAX-IO(Root) >> *ɾ >> MAX-C-IO[41]

b. $\text{MAX}_{\text{FIN}}$-C-IO >> *ɾ

---

[39] Non-deletion of the flap from /naɾa/ and /joɾi/ can be accounted for with **NO-CASUAL-MERGER** (see Chapter 5, 5.4) because we already have /na/ and /jo/ among particles, but this constraint cannot explain why the flap is not deleted from /nagara/ and /kɯrai/. Therefore, we still need $\text{MAX}_{\text{FIN}}$-C-IO.

[40] Horowitz, et al.'s (1968, 1969) experiments prove that endings are better recall prompts than middles in word recognition, and Nooteboom's (1981) experiment also shows that final fragments can be keys to successful word recognition. I thus believe that it is feasible to propose such a constraint as $\text{MAX}_{\text{FIN}}$-C-IO which outranks MAX-C-IO

[41] In Chapter 3, 3.3 we saw /te#i+ɾɯ/ → [teɾɯ]/*[tʃiɾɯ] 'be –ing', where a violation of IDENT-IO(anterior) is more serious than that of MAX-IO(Root), thus IDENT-IO(anterior) >> MAX-IO(Root) can be confirmed.

The relative ranking of *LAB and MAX$_{FIN}$-C-IO, however, cannot be established from the above data. It will be discussed in the next section where the reduction of /keredomo/ 'although' is accounted for.

## 4.6. INTERACTION OF MAX-C-IO WITH *LAB and *ɾ

The interaction of these constraints emerges from the consideration of the reduced forms, [kedo] 'although' and [k$^j$a] 'if' – forms which, from a general phonological point of view, look unlikely as optimal candidates for /keɾedomo/ and /keɾeba/, respectively. Therefore, the fact that they do emerge as optimal provides support both for the constraints I propose and their ranking.

### 4.6.1 /keɾedomo/ 'although'

The conjunctional particle /keɾedomo/ 'although' surfaces in four ways: [keɾedomo], [keɾedo], [kedomo] and [kedo], and, as the following table shows, the most reduced form, [kedo], is the one that is the most frequently used in casual speech:

(39) Occurrence and realisation of /keɾedomo/ 'although' according to the degree of formality

| /keɾedomo/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [keɾedomo] | 100 | (52%) | 90 | (29%) | 10 | (8%) | 200 | (32%) |
| [keɾedo] | 14 | (7%) | 28 | (9%) | 3 | (2%) | 45 | (7%) |
| [kedomo] | 48 | (25%) | 77 | (25%) | 8 | (7%) | 133 | (21%) |
| [kedo] | 30 | (16%) | 116 | (37%) | 100 | (83%) | 246 | (40%) |
| Total | 192 | (100%) | 311 | (100%) | 121 | (100%) | 624 | (100%) |

From a derivational theoretical point of view, the contraction of /keɾedomo/ can be accounted for as follows:

(40) Derivational theoretical analysis of contraction of /keɾedomo/

| | | | | |
|---|---|---|---|---|
| | /keɾedomo/ | /keɾedomo/ | /keɾedomo/ | /keɾedomo/ |
| labial deletion | n/a | keɾedoo | n/a | keɾedoo |
| vowel deletion | n/a | keɾedo | n/a | keɾedo |
| flap deletion | n/a | n/a | keedomo | keedo |
| vowel deletion | n/a | n/a | kedomo | kedo |
| | [keɾedomo] | [keɾedo] | [kedomo] | [kedo] |

In terms of OT, labial deletion and flap deletion are due to *LAB and *ɾ, respectively, and vowel deletion is due to avoidance of an ONSET violation, and these three constraints are ranked in the constraint hierarchy as follows:

(41) Constraint ranking 20[42]

ALIGN-SFX$^2$, CODACOND, CVLINKAGE(I), M-PARSE(tense), *wV[-low]
>>
IDENT-ONSET-IO(place)
>>
ANCHOR-IO(Open), IDENT-IO(place), MAX-IO(Open), MAX$_{\text{INIT}}$-C-IO
>>
IDENT-IO(anterior), ONSET
>>
*LAB
>>
MAX-IO(Root)
>>
*ɾ
>>
MAX-C-IO
>>
*i >> *ɯ >> *e >> *o >> *a
>>
MAX-V-IO

Let us first consider which candidate the constraint ranking we have established so far selects as the optimal candidate for /keɾedomo/ 'although'. (The constraints that none of the candidates violates and those that all the candidates violate equally are omitted from the tableaux in this chapter from now on.)

[42] This is a combined constraint ranking of (15b) and (38a) with ANCHOR-IO(Open) and the undominated constraint from (20).

(42) Tableau for /keɾedomo/ 'although' in casual speech[43]

| Input: /keɾedomo/ | MAX$_{INIT}$-C-IO | ONSET | *LAB | *ɾ | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ kedo | | | | | ** | ** |
| b. keɾedo | | | | *! | * | * |
| c. kedomo | | | *! | | * | * |
| d. keɾedomo | | | *! | * | | |
| e. keɾedoo | | *! | | * | * | |
| f. keedomo | | *! | * | | * | |
| g. ko | | | | | ***! | *** |
| h. do | *! | | | | *** | *** |

The tableau correctly selects the actual output [kedo] (42a). We thus see how independently needed constraints account for striking abbreviation of this conjunction in casual speech, without needing to posit a distinct underlying representation for this register of speech.

In (38) we left the relative ranking of *LAB and MAX$_{FIN}$-C-IO undecided. What will happen when MAX$_{FIN}$-C-IO is added to the tableau? MAX$_{FIN}$-C-IO is ranked above *ɾ (see (38b) above) but it cannot be an undominated constraint because the root-final /w/ is deleted when followed by non-low vowels. Therefore, it could be ranked in any of seven ways: (i) above MAX$_{INIT}$-C-IO (i.e. in the second highest stratum), (ii) in the same stratum as MAX$_{INIT}$-C-IO, (iii) below MAX$_{INIT}$-C-IO but above ONSET, (iv) in the same stratum as ONSET, (v) below ONSET but above *LAB, (vi) in the same stratum as *LAB, or (vii) below *LAB but above *ɾ (i.e. in the same stratum as MAX-IO(Root)). Let us see what will happen if we select (vi).

[43] Candidates with vowel coalescence (e.g. *[ke:do:], *[ke:domo], *[keɾedo:]) are omitted from the tableau. *[ke:do:] appears to fare better than the actual output [kedo] because it preserves all the vowels that are underlyingly present, but I believe that the reason why *[ke:do:] cannot be optimal is that coalescence of two vowels which are not adjacent underlyingly is prohibited in Japanese. (It cannot be due to a violation of **UNIFORMITY-IO** (no coalescence; McCarthy & Prince 1995). See Chapter 5, 5.5.1 and Chapter 7, 7.2 for further discussion on UNIFORMITY-IO and its effects.)

(43) Tableau for /keɾedomo/ 'although' in casual speech (revised)

| Input: /keɾedomo/ | MAX$_{INIT}$-C-IO | ONSET | *LAB | MAX$_{FIN}$-C-IO | *ɾ | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. kedo | | | | * | | **! | ** |
| b. keɾedo | | | | * | *! | * | * |
| c. ☹ kedomo | | | * | | | * | * |
| d. keɾedomo | | | * | | *! | | |
| e. keɾedoo | | *! | | * | * | * | |
| f. keedomo | | *! | * | | | * | |
| g. ko | | | | * | | **!* | *** |
| h. do | *! | | | * | | *** | *** |

This tableau would work well when accounting for another contracted form, [kedomo], which is often used in formal and semi-formal speech,[44] but not when accounting for the most reduced form, [kedo], that is dominant in casual speech. MAX$_{FIN}$-C-IO, therefore, must be dominated by *LAB. The following is a further revised tableau for /keɾedomo/ in casual speech, where *LAB outranks MAX$_{FIN}$-C-IO which in turn dominates *ɾ.

(44) Tableau for /keɾedomo/ 'although' in casual speech (further revised)

| Input: /keɾedomo/ | MAX$_{INIT}$-C-IO | ONSET | *LAB | MAX$_{FIN}$-C-IO | *ɾ | MAX-C-IO | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ kedo | | | | * | | ** | ** |
| b. keɾedo | | | | * | *! | * | * |
| c. kedomo | | | *! | | | * | * |
| d. keɾedomo | | | *! | | * | | |
| e. keɾedoo | | *! | | * | * | * | |
| f. keedomo | | *! | * | | | * | |
| g. ko | | | | * | | ***! | *** |
| h. do | *! | | | * | | *** | *** |

[44] It is assumed that those who use [kedomo] have MAX$_{FIN}$-C-IO ranked no lower than * LAB, as Tableau (43) shows. This ranking opts for *[keba] for /keɾeba/ 'if' in spite of the fact that *[keba] is never used even by those who use [kedomo]. This is because there is a constraint that prohibits intervocalic [b] in closed-class items, which dominates MAX$_{FIN}$-C-IO. See Chapter 6, 6.5 for further discussion on this constraint and Chapter 8, 8.6.1, for a 'gradient well-formedness' account of [kedomo]~[kedo].

This time the tableau selects the optimal candidate correctly. I, therefore, consider that $\text{MAX}_{\text{FIN}}$-C-IO is ranked in the same stratum as MAX-IO(Root), which is between *LAB and *ɾ. Here is a revised constraint ranking of (41).

(45) Constraint ranking 21

ALIGN-SFX², CODACOND, CVLINKAGE(I), M-PARSE(tense), *wV[-low]
>>
IDENT-ONSET-IO(place)
>>
ANCHOR-IO(Open), IDENT-IO(place), MAX-IO(Open), $\text{MAX}_{\text{INIT}}$-C-IO
>>
IDENT-IO(anterior), ONSET
>>
*LAB
>>
MAX-IO(Root), $\text{MAX}_{\text{FIN}}$-C-IO
>>
*ɾ
>>
MAX-C-IO
>>
*i >> *ɯ >> *e >> *o >> *a
>>
MAX-V-IO

This constraint ranking can be interpreted as follows: (i) a labial is deleted unless it is the leftmost consonant of a morpheme or it is in an open-class item, such as a noun, an adjective root or a full verb root; (ii) a flap is deleted unless it is either the leftmost or rightmost consonant of a morpheme, it is in an open-class item, or it is in a root, including an auxiliary verb root; (iii) all the other consonants are protected from deletion by MAX-C-IO, because there is no *C for any other consonant,[45] or because any such constraints are ranked below MAX-C-IO.[46] Hence /te#simaw+ɯ/ → [tʃaɯ] 'end up –ing' (from (i)) but /te#moɾaw+ɯ/ → [temoɾaɯ] 'receive the favour of –ing' (from (ii)), and /keɾedomo/ →

[45] There is, in fact, *g, which we discussed in Chapter 2, 2.2.3, but /g/ is never deleted. See Chapter 2, fn.32 and Chapter 5, 5.4 for further discussion on this.
[46] There is no such constraint as *d and that is why /keɾedomo/ 'although' is never contracted to *[keɾemo], *[keɾo] *[kemo], or *[ko].

[kedo] 'although' (from (i) and (ii)) but /so+ɾe#de#mo/ → [soɾedemo] 'even so' (from (i) and (ii)) and /nagaɾa/ → [naŋaɾa] 'while' (from (ii) and (iii)).[47]

4.6.2. /keɾeba/ 'if'

/keɾeba/ is a conjunctive particle meaning 'if', which follows the negative morpheme /(a)na/ or an adjective root. In formal speech every segment in /keɾeba/ is expected to surface as it is, but in less formal speech the morpheme is often contracted to [keɾʲa] or [kʲa].[48] The following table shows how /keɾeba/ is uttered when preceded by /na/:

(46) Occurrence and realisation of /na+keɾeba/ 'if not ...' according to the degree of formality

| /na+keɾeba/ | Formal | | Semi-formal | | Casual | | Total | |
|---|---|---|---|---|---|---|---|---|
| [nakeɾeba] | 19 | (39%) | 7 | (23%) | 0 | (0%) | 26 | (24%) |
| [nakeɾʲa] | 8 | (17%) | 1 | (3%) | 0 | (0%) | 9 | (9%) |
| [nakʲa] | 21 | (44%) | 22 | (74%) | 29 | (100%) | 72 | (67%) |
| Total | 48 | (100%) | 30 | (100%) | 29 | (100%) | 107 | (100%) |

The contraction of /keɾeba/ to [kʲa] is twofold. The following is its derivational theoretical analysis:[49]

[47] The only exceptions that I can think of are: (i) the topic/contrast marker /wa/ → [a] (see Chapter 5, 5.5.3), a conjunctive particle /eba/ → [ʲa] 'if' (see Chapter 6, 6.5), and a first person singular pronoun /watasi/ → [ataʃi] 'I, me', in which the leftmost labials are deleted from closed-class items (see fn.11); (ii) a second person singular pronoun /kimi/ → [kimi] 'you' and an adverbial particle /nomi/ → [nomi] 'only', in which the rightmost labials are not deleted. (I consider [temo] 'even if', [demo] 'even if' and [tomo] 'even if, also with ...' as /te#mo/, /de#mo/ and /to#mo/, respectively, so they all comply with the above interpretation.) I assume that non-deletion of the labial from /kimi/ is due to a constraint that requires a pronoun to be at least disyllabic (it cannot be due to a CONTIGUITY constraint because we do have /anata/ → [anta] 'you'), and that from /nomi/ is due to homophony avoidance (we already have both /ni/ and /no/ among particles). See Chapter 5, 5.4 for homophony avoidance in casual speech.

[48] The contraction, in fact, is often accompanied by the lengthening of the final vowel (i.e. [keɾja:], [kʲa:]) in order to compensate for the loss of mora count. See Chapter 6 for discussion on compensatory lengthening.

[49] I regard the process as labial deletion followed by glide formation, following Fukui (1986) and Poser (1988). Miyara (1980:112) proposes assimilation of /b/ to /a/ before glide formation, and Shibatani (1990: 176), when accounting for /te#wa/ → [tʃa], proposes w-deletion followed by j-epenthesis and e-deletion before assibiliation (see also fn.14). However, neither of their proposals is compatible with my OT analysis.

(47) Derivational theoretical analysis of contraction of /keɾeba/

| | | |
|---|---|---|
| | /keɾeba/ | |
| labial deletion | keɾea | |
| glide formation | keɾ$^j$a | ← [Stage I] |
| flap deletion | keja | |
| vowel deletion | k$^j$a | ← [Stage II] |
| | [k$^j$a] | |

Let us see which of the two forms the constraint ranking we have established in (45) selects as optimal.

(48) Tableau for /keɾeba/ 'if' in casual speech[50]

| Input: /keɾeba/ | ONSET | *LAB | MAX$_{FIN}$-C-IO | *ɾ | MAX-C-IO | *e | *a | MAX-V-IO |
|---|---|---|---|---|---|---|---|---|
| a. ☞ k$^j$a | | | * | | ** | | * | * |
| b. ka | | | * | | ** | | * | **! |
| c. keja | | | * | | ** | *! | * | |
| d. keɾ$^j$a | | | * | *! | * | * | * | |
| e. keɾa | | | * | *! | * | * | * | * |
| f. keba | | *! | | | * | * | * | * |
| g. keɾeba | | *! | | * | | ** | * | |
| h. keɾea | *! | | * | * | * | ** | * | |
| i kea | *! | | * | | ** | * | * | * |
| j keea | *!* | | * | | ** | ** | * | |

The actual output [k$^j$a] is correctly selected in this tableau, which also supports the validity of the constraint ranking I am proposing.

We need the *V subhierarchy to account for the choice of vowels to be deleted from hiatus in casual speech (see Chapter 3, 3.3), but when hiatus avoidance is not involved in contraction, the *V subhierarchy can be replaced with more conventional ***STRUC**.[51]

(49) Constraint 33

***STRUC**: No structure (Prince & Smolensky 1993).[52]

[50] Candidates with vowel coalescence (e.g. *[ke:a]) are omitted from the tableau.

[51] Another choice is **NO V** (Kirchner 1995, Orgun 1995).

Prince & Smolensky (1993/2002:25) argue that undesirable options typically involve extra structure in syntax and phonology, and propose the *STRUCTURE family constraints which ensure that structure is constructed minimally. Although *STRUC outranks MAX-V-IO, it is dominated by MAX-C-IO so that candidates which comply with it can emerge only when the deletion of nucleus does not create a consonant cluster that cannot be parsed or when glide formation is permitted to avoid an ONSET violation, as seen in /keɾeba/ → [kʲa] 'if'. Here is a revised tableau of (48), in which *STRUC has replaced *V subhierarchy.

(50) Tableau for /keɾeba/ 'if' in casual speech (revised)

| Input: /keɾeba/ | ONSET | *LAB | $\text{MAX}_{\text{FIN}}$-C-IO | *ɾ | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ kʲa | | | * | | ** | * | * |
| b. ka | | | * | | ** | * | **! |
| c. keja | | | * | | ** | **! | |
| d. keɾja | | | * | *! | * | ** | |
| e. keɾa | | | * | *! | * | ** | * |
| f. keba | | *! | | | * | ** | * |
| g. keɾeba | | *! | | * | | *** | |
| h. keɾea | *! | | * | * | * | *** | |
| i. kea | *! | | * | | ** | ** | * |
| j. keea | *!* | | * | | ** | *** | |

## 4.7 VARIANTS AMONG CONTRACTED FORMS

In 4.3 and 4.6, we have discussed three cases of contraction of closed-class items: /te# simaw+ɯ/ 'end up –ing', /keɾedomo/ 'although' and /keɾeba/ 'if'. As mentioned in relevant sections, they all have variants.

(51) Variants among contracted forms

| | | Contracted | Further Contracted |
|---|---|---|---|
| a. | /te#simaw+ɯ/ | [tʃimaɯ] | [tʃaɯ] |
| b. | /keɾedomo/ | [keɾedo] / [kedomo] | [kedo] |
| c. | /keɾeba/ | [keɾʲa] | [kʲa] |

[52] The use of *STRUC in this thesis is that of Zoll's (1993b) *STRUC(σ), which functions to minimise the total number of syllables in a word.

The constraint ranking that we have established in (45) can account for the contraction of /te#simaw+ɯ/ → [tʃaɯ], /keɾedomo/ → [kedo], and /keɾeba/ → [kʲa], but how should we account for the intermediate forms listed above? It looks as though there were at least one transitional stage before reranking of constraints has been completed. As far as I know, no one has modelled reranking of constraints in terms of transitional stages to account for variants observed synchronically in any language. In this section, we will look into this underdeveloped area and see how constraints are reranked as the degree of formality shifts from formal to casual.

Although [tʃimaɯ] (51a) was never observed in the data I collected in 1993-1994, it has its own entry in dictionaries (with specification as 'casual/spoken') and native Japanese speakers should have no difficulties in understanding it when uttered. In the contraction in question, the vowel between /t/ and /s/ drops and the two consonants flanking the vowel surface as an affricate. The contraction does not involve any consonant deletion so that MAX-C-IO must still dominate *LAB, but the fact that the vowel is deleted to reduce the number of syllables indicates that MAX-V-IO is demoted below *STRUC.[53] Thus:

(52) Constraint reranking 1

a. Formal speech
MAX-V-IO >> MAX-C-IO >> *LAB >> *ɾ >> *STRUC

b. Transitional stage to casual speech I
MAX-C-IO >> *LAB >> *ɾ >> *STRUC >> MAX-V-IO

Let us apply (52b) to /te#simaw+ɯ/ 'end up –ing' to see which candidate is selected as optimal. (Candidates that violate an undominated constraint and the constraints that all three candidates violate equally are omitted from the tableau.)

[53] As vowel deletion to resolve hiatus when the *te*-form is followed by a vowel-initial auxiliary verb starts to be observed before the degree of formality shifts from formal to semi-formal, it is assumed that MAX-V-IO is demoted directly from the highest stratum to a stratum below *STRUC.

(53) Tableau for /te#simaw+ɯ/ 'end up –ing' at a transitional stage I

| Input: /te#simaw+ɯ/ | MAX-C-IO | *LAB | *ɾ | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|
| a. ☞ tʃimaɯ | * | * | | *** | * |
| b. teʃimaɯ | * | * | | ****! | |
| c. tʃaɯ | **! | | | ** | * |

As we saw in (17), [tʃaɯ] is optimal in casual speech when constraint reranking has been completed. However, at a transitional stage where MAX-C-IO still dominates *LAB, [tʃimaɯ] is selected as the optimal candidate for /te#simaw+ɯ/ 'end up –ing'.

Next, let us apply this ranking to /keɾedomo/ 'although' and /keɾeba/ 'if'. (Candidates that violate ONSET are omitted from the tableaux.)

(54) Tableaux for /keɾedomo/ 'although' and /keɾeba/ 'if' at a transitional stage I

| Input: /keɾedomo/ | MAX-C-IO | *LAB | *ɾ | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|
| a. ☹ keɾedomo | | * | * | **** | |
| b. keɾedo | *! | | * | *** | * |
| c. kedomo | *! | * | | *** | * |
| d. kedo | *!* | | | ** | ** |

| Input: /keɾeba/ | MAX-C-IO | *LAB | *ɾ | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|
| e. ☹ keɾeba | | * | * | *** | |
| f. keɾʲa | *! | | * | ** | |
| g. kʲa | **! | | | * | * |

In both contraction processes consonant deletion is observed. Therefore, as long as MAX-C-IO is ranked higher than the featural markedness constraints, the forms with no deletion of consonants (i.e. actual outputs for formal speech) are selected as optimal. This means that there must be another transitional stage of constraint reranking. In the contraction of /keɾedomo/ → [keɾedo] 'although' and /keɾeba/ → [keɾʲa] 'if', as labials are deleted but flaps still surface, MAX-C-IO must be ranked between *LAB and *ɾ.

(55) Constraint reranking 2

a. Formal speech
MAX-V-IO >> MAX-C-IO >> *LAB >> *ɾ >> *STRUC

b. Transitional stage to casual speech I
MAX-C-IO >> *LAB >> *ɾ >> *STRUC >> MAX-V-IO

c. Transitional stage to casual speech II
*LAB >> MAX-C-IO >> *ɾ >> *STRUC >> MAX-V-IO

Here are revised tableaux of (54).

(56) Tableaux for /keɾedomo/ 'although' and /keɾeba/ 'if' at a transitional stage II

| Input: /keɾedomo/ | *LAB | MAX-C-IO | *ɾ | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|
| a. keɾedomo | *! | | * | **** | |
| b. ☞ keɾedo | | * | * | *** | * |
| c. kedomo | *! | * | | *** | * |
| d. kedo | | *!* | | ** | ** |

| Input: /keɾeba/ | *LAB | MAX-C-IO | *ɾ | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|
| e. keɾeba | *! | | * | *** | |
| f. ☞ keɾʲa | | * | * | ** | |
| g. kʲa | | **! | | * | * |

Let us see which candidate the constraint ranking at the second stage of transition selects as optimal for /te#simaw+ɯ/ 'end up –ing'.

(57) Tableau for /te#simaw+ɯ/ 'end up –ing' at a transitional stage II

| Input: /te#simaw+ɯ/ | *LAB | MAX-C-IO | *ɾ | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|
| a. tʃimaɯ | *! | * | | *** | * |
| b. teʃimaɯ | *! | * | | **** | |
| c. ☞ tʃaɯ | | ** | | ** | * |

We now know that there are two transitional stages in the process of constraint reranking. The following summarises the above discussion:[54]

[54] As briefly mentioned in fn.53, I consider that MAX-V-IO is demoted below *STRUC straight away, without intervening between MAX-C-IO and *LAB, between *LAB and *ɾ, or between *ɾ and *STRUC. When MAX-V-IO dominates *STRUC, [teʃimaɯ], which is the actual output for formal speech, is selected as optimal for /te#simaw+ɯ/ 'end up –ing', regardless of the position of MAX-V-IO.

(58) Constraint reranking 3[55]

| | | | | |
|---|---|---|---|---|
| a. Formal speech (before reranking)<br>MAX-V-IO >> MAX-C-IO >> *LAB<br>>> *ɾ >> *STRUC | ➪ | [teʃimaɯ] | [keɾedomo] | [keɾeba] |
| b. Transitional stage to casual speech I<br>MAX-C-IO >> *LAB >> *ɾ<br>>> *STRUC >> MAX-V-IO | ➪ | [tʃimaɯ] | [keɾedomo] | [keɾeba] |
| c. Transitional stage to casual speech II<br>*LAB >> MAX-C-IO >> *ɾ<br>>> *STRUC >> MAX-V-IO | ➪ | [tʃaɯ] | [keɾedo] | [keɾʲa] |
| d. Casual speech (after reranking)<br>*LAB >> *ɾ >> MAX-C-IO<br>>>*STRUC >> MAX-V-IO | ➪ | [tʃaɯ] | [kedo] | [kʲa] |

What (58) implies is that all four rankings are potentially possessed by any one speaker. However, judging from the fact that [tʃimaɯ] 'end up –ing' was never observed in my 1993-1994 data and that the occurrence of [keɾedo] 'although' and that of [keɾʲa] 'if' are considerably low (see (39) and (46)), it is plausible to say that many simply do not possess (58b) or (58c).[56] Another thing which is noteworthy is that the constraint reranking merely involves the downgrading of two faithfulness constraints (i.e. MAX-V-IO and MAX-C-IO) with no mutual reranking of markedness constraints.

## 4.8 SUMMARY

In Japanese there are two featural markedness constraints, namely, *LAB and *ɾ, which have effects in casual speech. Context-free MAX-IO constraints are high-ranking in formal speech; MAX-V-IO is undominated and MAX-C-IO outranks *LAB and *ɾ. Thus, neither vowel nor consonant deletion takes place. However, when MAX-V-IO and MAX-C-IO are

[55] None of these rankings selects [kedomo] for /keɾedomo/ 'although'. In order for this candidate to become optimal, *LAB and $\text{MAX}_{\text{FIN}}$-C-IO need to be ranked in the same stratum, as seen in Tableau (43). As mentioned in fn.44, we will discuss how [kedomo] surfaces as optimal in the light of 'gradient well-formedness' in Chapter 8, 8.6.1.

[56] I do not use [tʃimaɯ], [keɾedo] or [keɾʲa] so I must say that I am one of those who do not possess (58b) or (58c).

demoted below *STRUC (or the *V subhierarchy) and *ɾ, respectively, the two featural markedness constraints interact with other constraints to create less marked structures by means of deletion of labials/flaps or nasalisation of flaps (see Chapter 5 for the latter).

However, not every labial or flap is deleted in casual speech. With the exception of stem-final /w/ followed by a non-low vowel and a small number of isolated cases, neither labials nor flaps are deleted from open-class items. This is because open-class items are privileged in Japanese, as discussed in Chapter 3, 3.4, and are far more resistant to deletion of segments than closed-class items.

Although both *LAB and *ɾ affect the configurations of closed-class items in casual speech, these two constraints do not behave in exactly the same way. Because of a high-ranking positional faithfulness constraint, $\text{MAX}_{\text{INIT}}$-C-IO, both labials and flaps are protected from deletion when they are leftmost consonants of morphemes. However, as two other positional faithfulness constraints, MAX-IO(Root) and $\text{MAX}_{\text{FIN}}$-C-IO, intervene between *LAB and *ɾ, flaps are also protected from deletion when they are in roots or when they are rightmost consonants of morphemes, while no such treatment is given to labials so that labials in those positions are readily deleted. Thus, we can say that labials are more susceptible to deletion than flaps.

In Japanese, there are two transitional stages in the process of constraint reranking as the degree of formality shifts from formal to casual, and the constraint ranking at each stage leaves a mark upon the surface form to create variants among contracted forms. In the last section of this chapter, we discussed how simple reranking of constraints can account for such variants.

While labials surface as they are in protected positions, those in unprotected positions are simply deleted. Flaps in unprotected positions are also subject to deletion. However, there are cases in which flaps in both protected and unprotected positions undergo nasalisation, instead of deletion, in order to better satisfy MAX-C-IO. In the next chapter, we will deal with flap nasalisation – another manifestation of flap avoidance.

# CHAPTER FIVE

## FLAP NASALISATION AND GHOST SEGMENTS

### 5.1 INTRODUCTION

In the previous chapter, we saw how *LAB (Smolensky 1993) and *ɾ (McCarthy & Prince 1995) interact with a number of MAXIMALITY family constraints to produce less marked structures in casual Japanese speech. IDENT-ONSET-IO(place) (Beckman 1998) is a high-ranking constraint in Japanese so that labials cannot surface as coronals[1], and the domination of MAX-C-IO by *LAB and *ɾ means that a violation of these two markedness constraints is resolved by way of deleting the offending segments, unless such segments are protected by constraints ranked higher than the markedness constraints in question. However, there are cases in which flaps surface as nasals in order to satisfy both *ɾ and MAX-C-IO at the expense of an IDENT-IO(nasal) (McCarthy & Prince 1995) violation. In this chapter, we will examine this nasalisation of flaps, to which I refer simply as 'flap nasalisation',[2] in the light of constraint interaction and, in some cases, by invoking the concept of floating segments (Hyman 1985) (or latent/ghost segments in Zoll's (1993a, 1993b, 1994, 1996) terms). Along the way I will propose **NO-CASUAL-MERGER** to discuss the case of non-merger of /siɾ/ 'know' and /sin/ 'die', among others, in casual speech.

### 5.2 FLAP NASALISATION

Apart from a few isolated cases, such as /toko/ (casual allomorph of /tokoɾo/) → [toko] 'place' and /kosiɾae+ɾɯ/ → /kosae+ɾɯ/ → [kosaeɾɯ] 'produce' (due to lexicalisation), no deletion of flaps from open-class items takes place. This is because MAX-IO(Open)

[1] With the exception of root-final /b/ and /w/ when followed by /te/ or /ta/, in which case the labials surfaces as [n] and as [t], respectively, due to undominated CODACOND, yet neither violates IDENT-ONSET-IO(place). See Chapter 2, 2.3 for detailed discussion.

[2] As briefly mentioned in Chapter 1, 1.4, some phonologists describe this process as 'nasal syllabification'. However, when a flap surfaces as a nasal, it always occupies a coda position and, although it is moraic, it is never syllabic. Therefore, the term 'nasal syllabification' to refer to the process in question is misleading.

dominates *ɾ. Also, both MAX$_{\text{INIT}}$-C-IO and MAX$_{\text{FIN}}$-C-IO outrank *ɾ so that a flap is not deleted when it is the leftmost or rightmost consonant of a morpheme. Furthermore, as a flap in a root is protected by MAX-IO(Root), it never drops from an auxiliary verb either. Thus:

(1) Non-avoidance of flaps (from Chapter 4 (36))

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kaɾada | kaɾada | kaɾada | 'body' |
| b. | te#moɾaw+ɯ | temoɾaɯ | temoɾaɯ | 'receive the favour of –ing' |
| c. | taiɾa+na | taiɾana | taiɾana | 'flat' |
| d. | haɾe#naɾa | haɾenaɾa | haɾenaɾa | 'if the weather is good' |
| e. | mi#nagaɾa | minaŋaɾa | minaŋaɾa | 'while watching' |
| f. | watasi#joɾi | wataʃijoɾi | wataʃijoɾi | 'than me' |
| g. | so+ɾe#kɯɾai | soɾekɯɾai | soɾekɯɾai | 'that much, to that extent' |

NB: Protected by MAX-IO(Open) – /ɾ/ in /kaɾada/ (1a), /taiɾa/ (1c) and /haɾe/ (1d);
Protected by MAX$_{\text{INIT}}$-C-IO – /ɾ/ in /ɾe/ (1g);
Protected by MAX$_{\text{FIN}}$-C-IO – /ɾ/ in /naɾa/ (1d), /nagaɾa/ (1e), /joɾi/ (1f) and /kɯɾai/ (1g) as well as /ɾ/ in /taiɾa/ (1c) and /haɾe/ (1d);
Protected by MAX-IO(Root) – /ɾ/ in /moɾaw/ (1b).

This means that a flap only drops when it is flanked by consonants within a closed-class item other than an auxiliary verb root, such as /keɾedomo/ 'although' or /keɾeba/ 'if', and that flap deletion only applies to a limited number of words which happen to be closed-class items with at least three syllables and a medial flap. However, avoidance of flaps can manifest itself not only through deletion but also through nasal assimilation, as seen below:

(2) Avoidance of flaps by nasal assimilation (from Chapter 4 (25), (31) and fn.35)

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | iɾo+RED+na | iɾoiɾona | iɾonna | 'various' |
| b. | ɾaɾe+na+i | ɾaɾenai | ɾannai[3] | 'cannot (do), not be (done)' |
| c. | kaeɾ+ana+i | kaeɾanai | kaennai | 'not return' |
| d. | jaɾ+i#nasa+i | jaɾinasai | jannasai | 'do!' |
| e. | haiɾ+ɯ#no | haiɾɯno | hainno | 'enter?, will enter' |

[3] See 5.2.3 for in-depth discussion on this flap nasalisation.

5.2.1 Non-Occurrence of Flap Nasalisation 1

The fact that avoidance of flaps by means of flap nasalisation can take place in /ɾVnV/ in conjunction with vowel deletion, suggests that it is more important to satisfy *ɾ than IDENT-IO(nasal). Therefore, we can establish *ɾ >> IDENT-IO(nasal). However, the fact that flap nasalisation is blocked when the first V of /ɾVnV/ belongs to an open-class item, as seen in (1c-d), means that there is a high-ranking constraint that prevents the V in question from being deleted, and the constraint responsible for it is MAX-IO(Open).[4, 5] The following combined tableau shows the effect of MAX-IO(Open) on /ɾV+nV/ in which /ɾV/ belongs to an open-class item:

(3) Combined tableau for /taiɾa+na/ 'flat' and /haɾe#naɾa/ 'if the weather is good' in casual speech

| Input: | | MAX-IO(Open) | *ɾ | IDENT-IO(nasal) |
|---|---|---|---|---|
| /taiɾa+na/ | a. ☞ taiɾana | | * | |
| | b. tainna | *! | | * |
| /haɾe#naɾa/ | c. ☞ haɾenaɾa | | ** | |
| | d. hannaɾa | *! | * | * |

When the first V of /ɾVnV/ belongs to a closed-class item, on the other hand, it can drop and prompts the preceding flap to assimilate to the following nasal, as seen in (2), but this does not apply to any vowel in a closed-class item. For instance, a /ɾVnV/ sequence is created when a verb with root-final /ɾ/ is followed by a potential morpheme /e/ and a morpheme with initial /n/; this /e/ is never deleted and flap nasalisation never takes place in this context, as seen below:[6]

[4] Alternatively, ANCHOR-IO(Open), which is ranked in the same stratum as MAX-IO(Open).

[5] There is an exception, however. Both Miyara (1980:93) and Shibatani (1990:176) give /kɯɾe+na+i/ → [kɯnnai] 'not give (me)' as one of their examples of flap nasalisation. However, as [kɯnnai] violates MAX-IO(Open), it should be considered as an isolated case caused by the combination of frequency effects and flap avoidance (/kɯɾe/ is the 89th most frequently used word in Japanese, according to the National Institute of Japanese Language (1962)). Miyara (ibid.) also provides /taɾi+na+i/ → [tannai] 'not suffice' as another example, but [tannai] should be regarded as the reduced form of /taɾ+ana+i/ 'not suffice'.

[6] I consider that [ʃinnai] in [kamoʃinnai] 'maybe' has /siɾe+na+i/ 'not be known', not /siɾ+e+na+i/ 'cannot know', as its underlying representation.

(4) Non-occurrence of flap nasalisation: potential negative form

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kaeɾ+e+na+i | kaeɾenai | kaeɾenai | 'cannot return' |
| | kaeɾ+ana+i | kaeɾanai | kaennai | 'not return' |
| b. | jaɾ+e+na+i | jaɾenai | jaɾenai | 'cannot do' |
| | jaɾ+ana+i | jaɾanai | jannai | 'not do' |
| c. | haiɾ+e+na+i | haiɾenai | haiɾenai | 'cannot enter' |
| | haiɾ+ana+i | haiɾanai | hainnai | 'not enter' |

The potential morpheme /e/ always surfaces regardless of the register of speech because its deletion incurs a violation of **M-PARSE(potential)**.[7]

(5) Constraint 34

**M-PARSE(potential)**: A potential morpheme must be parsed.

Potential morphemes (/e/ for consonant-final root verbs; /ɾaɾe/ for vowel-final root verbs) are never completely deleted so that potentiality can be clearly expressed, and M-PARSE (potential) is considered to be inviolable. Let us draw a tableau for /kaeɾ+e+na+i/ 'cannot return' (4a) and confirm that /kaeɾ+e+na+i/ must surface as [kaeɾenai]. (Constraints that none of the candidates violates and those that all the candidates violate equally are omitted from the tableaux in this chapter, together with some low-ranking constraints).

(6) Tableau for /kaeɾ+e+na+i/ 'cannot return' in casual speech

| Input: /kaeɾ+e+na+i/ | CODACOND | M-PARSE(potential) | *ɾ | IDENT-IO(nasal) |
|---|---|---|---|---|
| a. ☞ kaeɾenai | | | * | |
| b. kaennai | | *! | | * |
| c. kaeɾnai | *! | * | * | |

In the above tableau the actual output (6a) is correctly selected as optimal, but if we include *[kaenenai] among the candidates, this candidate seems to fare better than [kaeɾenai]

[7] As mentioned in Chapter 4, 4.3, /i/, a morpheme which turns a verb stem into a noun equivalent, can drop in casual speech in order to better satisfy *STRUC, so what we need to account for non-deletion of the potential morpheme /e/ is more than just M-PARSE (or REALISE-MORPHEME).

because the former does not violate CODACOND, M-PARSE(potential) or *ɾ. The reason why it cannot be optimal, however, is that it involves a violation of **IDENT-ONSET-IO (nasal).**[8]

(7) Constraint 35

**IDENT-ONSET-IO(nasal)**: No change in the values for [nasal] of an onset.

In standard Japanese, /g/ preceded by a moraic nasal and intervocalic /g/ surface as [ŋ] (e.g. /kaNgae/ → [kaŋŋae] 'thought, idea', /kagi/ → [kaŋi] 'key'; see Chapter 2, 2.2.3), thus IDENT-ONSET-IO(nasal) is violated in order to satisfy *g (McCarthy & Prince 1995, Itô & Mester 1997). IDENT-ONSET-IO(nasal), therefore, must be outranked by *g but it has to dominate *ɾ in order for [kaeɾenai] (6a) to beat *[kaenenai]. In Chapter 2, 2.4, we ranked *g in the same stratum as ONSET for formal speech. If we assume that *g and ONSET are still ranked together in casual speech, then we expect IDENT-ONSET-IO(nasal) to be placed either in the same stratum as *LAB or in the same stratum as $\text{MAX}_{\text{FIN}}$-C-IO and MAX-IO(Root) (see Chapter 4 (41)). As we do not have any evidence to prove that IDENT-ONSET-IO(nasal) should be ranked any lower than *LAB, I rank it in the same stratum as *LAB.

(8) Constraint ranking 22

ONSET, *g
>>
IDENT-ONSET-IO(nasal), *LAB
>>
$\text{MAX}_{\text{FIN}}$-C-IO, MAX-IO(Root)
>>
*ɾ
>>
IDENT-IO(nasal)

---

[8] Alternatively, we could invoke **NOGAP** (no spread of features between non-adjacent segments; Itô, Mester & Padgett 1995). NOGAP is an OT equivalent of the No-Crossing constraint in Autosegmental Phonology (Goldsmith 1976). This constraint is likely to be violated in languages with voicing assimilation and/or vowel harmony. In Japanese, non-adjacent voicing assimilation never takes place and vowel harmony does not exist, thus NOGAP is an inviolable constraint. (Classical Japanese displayed what could be considered to be vowel harmony. See Hattori 1976:257-259, Kamei 1981:690-692, and Tsukishima 1988:70-71, among others.) For an OT analysis of vowel harmony, see Kirchner (1993).

Let us add *[kaenenai] and IDENT-ONSET-IO(nasal) to Tableau (6) to confirm that the actual output [kaerenai] is still opted for by our constraint ranking.

(9) Tableau for /kaer+e+na+i/ 'cannot return' in casual speech (revised)

| Input: /kaer+e+na+i/ | CODA COND | M-PARSE (potential) | IDENT-ONSET -IO(nasal) | *r | IDENT-IO (nasal) |
|---|---|---|---|---|---|
| a. ☞ kaerenai | | | | * | |
| b. kaenenai | | | *! | | * |
| c. kaennai | | *! | | | * |
| d. kaernai | *! | * | | * | |

5.2.2. Non-Occurrence of Flap Nasalisation 2

Flap nasalisation is a regressive assimilation process, as seen in (2) and (4), but can it also be a progressive assimilation process, that is, can a flap surface as a nasal when it is preceded by another nasal and a vowel (i.e. /VnVr/, the mirror image of /rVnV/)? When the verb between the nasal and the flap belongs to an open-class item, we expect that flap nasalisation never takes place due to high-ranking MAX-IO(Open), but when it belongs to a closed-class item, is it possible for the vowel to drop and induce flap nasalisation? I only know three contexts in which the second vowel of /VnVr/ belongs to a closed-class item: (i) /sin/ 'die' followed by a potential morpheme and a non-past tense morpheme /e+rɯ/, (ii) /sin/ 'die' followed by a passive morpheme /are/, and (iii) a conjunctive particle /nara/ 'if'.[9]

(10) /VnVr/ sequence

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | sin+e+rɯ | ʃinerɯ | ʃinerɯ / *ʃinnɯ | 'can die' |
| b. | sin+are+rɯ | ʃinarerɯ | ʃinarerɯ / *ʃinnerɯ | 'die (on me)' |
| c. | ik+ɯ#nara | ikɯnara | ikɯnara / *ikɯnna | 'if go' |

[9] In Classical Japanese, flaps could surface as [m], as seen in [arɯmeri] → [ammeri] 'there seems' (see Chapter 4 (24)), but this kind of flap nasalisation is no longer observed in Modern Japanese due to high-ranking IDENT-IO(place).

The deletion of /e/ from /sin+e+ɾɯ/ (10a) incurs a violation of undominated M-PARSE (potential) so that /sin+e+ɾɯ/ can never surface as *[ʃinnɯ]. In /sin+aɾe+ɾɯ/ (10b), on the other hand, the deletion of /a/ does not incur any of the undominated or high-ranking constraints we have discussed so far, and neither does the deletion of the first /a/ from /ik+ɯ#naɾa/ (10c). However, as the following tableaux show, IDENT-ONSET-IO(nasal) can prevent /sin+aɾe+ɾɯ/ (10b) and /ik+ɯ#naɾa/ (10c) from undergoing flap nasalisation.

(11) Tableaux for /sin+aɾe+ɾɯ/ 'die (on me)' and /ik+ɯ#naɾa/ 'if go' in casual speech[10]

| Input: /sin+aɾe+ɾɯ/ | *Nɾ | IDENT-IO (lateral) | MAX$_{\text{INIT}}$-C-IO | IDENT-ONSET-IO(nasal) | *ɾ | IDENT-IO (nasal) |
|---|---|---|---|---|---|---|
| a. ☞ ʃinaɾeɾɯ | | | | | ** | |
| b. ʃinneɾɯ | | | | *! | * | * |
| c. ʃinaneɾɯ | | | | *! | * | * |
| d. ʃinanenɯ | | | | *!* | | ** |
| e. ʃinaɾɯ | | | *! | | * | |
| f. ʃinleɾɯ | | *! | | | * | |
| g. ʃinɾeɾɯ | *! | | | | ** | |

| Input: /ik+ɯ#n$_1$a$_2$ɾa/ | *Nɾ | IDENT (lateral) | IDENT (place) | MAX $_{\text{INIT}}$-C | IDENT-ONSET-IO(nasal) | MAX $_{\text{FIN}}$-C | *ɾ | IDENT (nasal) |
|---|---|---|---|---|---|---|---|---|
| h. ☞ ikɯnaɾa | | | | | | | * | |
| i. ikɯn$_1$a | | | | | | *! | | |
| j. ikɯnna | | | | | *! | | | * |
| k. ikɯnana | | | | | *! | | | * |
| l. ikɯn$_2$a | | | | *! | * | | | * |
| m. ikɯnaN | | | *! | | | | | * |
| n. ikɯnla | | *! | | | | | | |
| o. ikɯnɾa | *! | | | | | | * | |

Although IDENT-IO(nasal) is ranked lower than *ɾ, the domination of the latter by IDENT-ONSET-IO(nasal) makes sure that a flap in /nVɾV/ is never turned into a nasal, and this answers the question raised at the beginning of this subsection: can flap nasalisation be also a progressive assimilation process? The answer is no, because the corresponding input

[10] See Chapter 2, 2.2.4 and 2.4 for the ranking of *Nɾ and IDENT-IO(lateral).

segment of an onset [n] must be [+nasal]; a flap can surface as a nasal in a coda position but not in an onset position due to IDENT-ONSET-IO(nasal) >> *ɾ.

5.2.3 Flap Nasalisation Across a Boundary Between Two Closed-Class Items

As we have discussed in the last two subsections, flap nasalisation is a regressive assimilation process and it can only take place when the first V in /ɾVnV/ belongs to a closed-class item. In this subsection we will examine a case of flap nasalisation observed across a boundary between two closed-class items, namely, /ɾaɾe/ and /na/ (e.g. /ɾaɾe+na+i/ → [ɾannai] 'cannot (do), not be (done)' (2b)).

/ɾaɾe/ is a morpheme attached to a vowel-final root verb to mean 'can' or to indicate the passive voice. Let us call this morpheme 'potential/passive morpheme'. When this morpheme is followed by the negative morpheme /na/, the vowel between the second flap and the nasal drops and the flap assimilates to the nasal in casual speech. The vowel is not protected by either MAX-IO(Open) or MAX-IO(Root), and its deletion only incurs a violation of low-ranking MAX-V-IO. Therefore, it is plausible to assume that the vowel in question should drop and flap nasalisation should follow. Here is a tableau for /ɾaɾe+na+i/ 'cannot (do), not be (done)' in casual speech.

(12) Tableau for /ɾaɾe+na+i/ 'cannot (do), not be (done)' in casual speech

| Input: /ɾaɾe+na+i/ | IDENT-ONSET-IO(nasal) | $\text{MAX}_{\text{FIN}}$-C-IO | *ɾ | IDENT-IO(nasal) |
|---|---|---|---|---|
| a. ☞ ɾannai | | | * | * |
| b. ɾaɾenai | | | **! | |
| c. ɾanai | | *! | * | |
| d. nannai | *! | | | ** |

The above tableau, indeed, confirms our assumption and [ɾannai] is correctly selected as optimal.

Up until now we have not yet established the exact ranking of IDENT-IO(nasal) in relation to other low-ranking constraints, such as MAX-C-IO (Kager 1999), *STRUC (Prince & Smolensky 1993) and *MAX-V-IO (Kager 1999). As long as IDENT-IO(nasal) is placed lower than *ɾ, a flap can surface as a nasal but exactly where should this constraint be ranked? There is a piece of evidence that can shed light on it; /ko+ko#de#no/ 'of this place' is composed of /ko+ko/, a demonstrative pronoun meaning 'this place', the locative particle /de/ and the genitive particle /no/. Although the vowel between /d/ and /n/ is not protected by any constraint ranked higher than *STRUC, this phrase never surfaces as *[kokonno] just to satisfy *STRUC at the expense of an IDENT-IO(nasal) violation. This means that IDENT-IO(nasal) must dominate *STRUC,[11] thus the only stratum where IDENT-IO(nasal) can be placed is between *ɾ and *STRUC, that is, the stratum to which MAX-C-IO belongs. Here is a revised tableau for /ɾaɾe+na+i/ 'cannot (do), not be (done)' in casual speech with MAX-C-IO, *STRUC and *MAX-V-IO.

(13) Tableau for /ɾaɾe+na+i/ 'cannot (do), not be (done)' in casual speech (revised)

| Input: /ɾaɾe+na+i/ | IDENT-ONS -IO(nasal) | $\text{MAX}_{\text{FIN}}$ -C-IO | *ɾ | IDENT-IO(nasal) | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ ɾannai | | | * | * | | *** | * |
| b. ɾaɾenai | | | **! | | | **** | |
| c. ɾanai | | *! | * | | * | *** | * |
| d. nannai | *! | | | ** | | *** | * |

5.2.4. Flap Nasalisation Across a Boundary Between Open- and Closed-Class Items

Next, let us discuss flap nasalisation in /ɾVnV/, in which a root-final flap is followed by a vowel and a nasal,[12] as seen in (2c-e), which are repeated below.

(14) Avoidance of flaps by nasal assimilation

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | kaeɾ+ana+i | kaeɾanai | kaennai | 'not return' |
| b. | jaɾ+i#nasa+i | jaɾinasai | jannasai | 'do!' |
| c. | haiɾ+ɯ#no | haiɾɯno | hainno | 'enter?, will enter' |

[11] When IDENT-IO(nasal) dominates *STRUC, flap nasalisation will never take place if there is no such markedness constraint as *ɾ, due to the interaction of CODACOND and IDENT-ONSET-IO(nasal). Therefore, the need for *ɾ in our constraint hierarchy is well supported by independent evidence.

[12] /ɾ/ as a morpheme-final segment is only acceptable in consonant-final verb roots.

When a verb with root-final /ɾ/ is followed by such suffixes as /ana+i/ (negation; /ana/: negative, /i/: non-past tense), /i#nasa+i/ (command; /i/: turning a verb into a noun equivalent, /nasa/: allomorph of honorific auxiliary verb /nasaɾ/, /i/: non-past tense) and /ɯ#no/ (question/assertion; /ɯ/: non-past tense, /no/: explanatory predicate - question with a rising intonation and assertion with a falling intonation), systematic avoidance of flaps is observed in casual speech by means of flap nasalisation in conjunction with vowel deletion. This can be accounted for from the point of view of derivational theoretical analysis as follows:

(15) Derivational theoretical analysis of flap nasalisation[13]

| | | | |
|---|---|---|---|
| | /kaeɾ+ana+i/ | /jaɾ+i#nasa+i/ | /haiɾ+ɯ#no/ |
| vowel deletion | kaeɾnai | jaɾnasai | haiɾno |
| flap nasalisation | kaennai | jannasai | hainno |
| | [kaennai] | [jannasai] | [hainno] |

Let us draw a combined tableau for (14a-c) to see if our constraint ranking correctly selects respective optimal candidates.

(16) Combined tableau for /kaeɾ+ana+i/ 'not return', /jaɾ+i#nasa+i/ 'do!' and /haiɾ+ɯ# no/ 'enter?, will enter' in casual speech

| Input: | | M-PARSE(tense) | *ɾ | IDENT-IO(nasal) | MAX-V-IO |
|---|---|---|---|---|---|
| /kaeɾ+ana+i/ | a. kaeɾanai | | *! | | |
| | b. ☞ kaennai | | | * | * |
| /jaɾ+i#nasa+i/ | c. jaɾinasai | | *! | | |
| | d. ☞ jannasai | | | * | * |
| /haiɾ+ɯ#no/ | e. ☹ haiɾɯno | | * | | |
| | f. hainno | *! | | * | * |

The deletion of /a/ from the negative morpheme /ana/ in /kaeɾ+ana+i/ 'not return' and that of /i/ from /jaɾ+i#nasa+i/ 'do!' do not pose any problem,[14] but the violation incurred by the

[13] This analysis is on a par with Miyara (1980:93) and Shibatani (1990:176).

[14] When the preceding root-final consonant is /b/, /m/, /w/, /g/ or /k/, neither /a/ nor /i/ can be deleted because (i) if the vowel is deleted, a CODACOND violation will be incurred and (ii) one of the consonants at the root-suffix boundary could assimilate to the other in order to avoid a CODACOND violation but this would lead to a

deletion of the tense morpheme /ɯ/ from /haiɾ+ɯ#no/ 'enter?, will enter' is serious enough to eliminate the actual output (16f) from the contention completely. We could assume that /ɯ/ is not present underlyingly in casual speech (e.g. /haiɾ#no/ → [hainno] 'enter?, will enter'), but two questions would arise from this assumption. (i) When the root-final consonant is not a flap, [ɯ] must precede [no] when one wishes to say '(do)?, will (do)' even in casual speech, as in [kakɯno] 'write?, will write' and [jomɯno] 'read?, will read'. We saw in Chapter 2, 2.3 that, in the formation of the *te*-form of verbs, a CODACOND violation is never resolved by means of vowel insertion, except for /s+te/ → [ʃite], due to high-ranking DEP-V-IO. Whether in formal speech or in casual speech, the formation of the *te*-form remains the same, and DEP-V-IO is still a high-ranking constraint in casual speech. How, then, could we account for the different measures taken to satisfy CODACOND if we assumed /ɯ/ to be epenthetic? (ii) The Japanese epenthetic vowel is [i], as we discussed in Chapter 2, 2.3.3. If we had to insert a vowel in order to resolve a cluster of consonants that cannot be parsed, why would /ɯ/ be employed as an epenthetic vowel only in the context in question?[15] The easiest way to answer these two questions is to assume that /ɯ/ is, in fact, present or at least encoded in the underlying representation for the expression '(do)?, will (do)'.

We could assume that there are two suffixes for question/assertion for consonant-final root verbs in casual speech: one for verbs with root-final /ɾ/ and the other for the rest; that is, /Ø#no/ for the former and /ɯ#no/ for the latter. However, the analysis I adopt here is proposed by Zoll (1993a, 1993b, 1994, 1996): ghost segmental analysis.

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violation of high-ranking IDENT-IO(place). When the root-final consonant is /s/ or /t/, IDENT-IO(place) will not be violated even if the vowel is deleted and one of the consonants at the boundary assimilates to the other. However, alternation between a coronal obstruent and a nasal is more costly than palatalisation/affrication of a coronal obstruent in terms of constraint violations (see 5.3.2 and 5.3.3), thus no deletion of a vowel takes place when /ana+i/ or /i#nasa+i/ follows /s/ or /t/. When /n/ is the root-final consonant, CODACOND will not be violated even if /a/ or /i/ is deleted, but it will result in a violation of NO-CASUAL-MERGER (see 5.4 below).

[15] A possible answer to this questions is Output-Variant correspondence proposed by Kawahara (2001), but the answer to the first question will still remain a mystery.

## 5.3 GHOST SEGMENTS

Zoll (1993a:184) describes 'ghost segments' (or 'latent segments') as consonants and vowels which surface in some contexts but not in others.[16] According to Hyman (1985), yers in Russian are such segments, which he calls 'floating segments'; they are realised with their vowel height lowered when followed by a consonant and another yer, as in (17a), and are deleted when followed by a consonant and a non-yer vowel, as in (17b).

(17) Yers (U) in Russian (from Hyman 1985:58-59)

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | lUbU | lob | 'forehead (NOM)' |
| b. | lUba | lba | 'forehead (GEN)' |

In the case of the Russian yer, the ghost segment surfaces only when the output would lack a nucleus without it, and a complex onset is permitted as long as a syllable has a nucleus. Within the framework of OT, this can be accounted for with the interaction of four constraints: NUCLEUS (Prince & Smolensky 1993), *COMPLEX (ibid.), *STRUC and MAX-IO (McCarthy & Prince 1995). The following combined tableau shows how these constraints interact with each other to select [lob] and [lba] as optimal candidates for /lUbU/ 'forehead (NOM)' and /lUba/ 'forehead (GEN)', respectively:

(18) Combined tableau for /lUbU/ 'forehead (NOM)' and /lUba/ 'forehead (GEN)'

| Input: | | NUCLEUS | MAX-IO | *STRUC | *COMPLEX |
|---|---|---|---|---|---|
| /lUbU/ | a. ☞ lob | | | * | |
| | b. lbo | | | * | *! |
| | c. lobo | | | **! | |
| | d. lb | *! | | | * |
| /lUba/ | e. lob | | *! | | |
| | f. ☞ lba | | | * | * |
| | g. loba | | | **! | |
| | h. lb | *! | * | | * |

[16] Zoll (1993a:188, 1996:198) gives the following as examples of languages that possess ghost segments: Afar, Armenian, Axininca Campa, Dakota, Swahili, Wolof, Korean, French, Tiwi, Polish, Slovak and Yokus.

The crucial point in this account is that the deletion of a ghost segment does not incur a violation of MAX-IO. When it does not surface, it is considered to be absent in the underlying representation.

Let us return to flap nasalisation in Japanese. I consider the non-past tense suffix /ɯ/ in /ɯ#no/ (question/assertion) to be a ghost segment which, just like the Russian yer, surfaces only when needed to satisfy high-ranking constraints.

5.3.1 Ghost Segment Preceded by a Non-Coronal Consonant

In Japanese there are nine consonants that are used root-finally: /b/, /m/, /w/, t/, /s/, /n/, /ɾ/, /g/ and /k/. Of these consonants, all but /n/ violate CODACOND when directly followed by /nV/. Therefore, if a ghost segment does not surface, a violation of CODACOND will have to be avoided by deleting one of the consonants at the root-suffix boundary or by assimilating the place of articulation (and the manner of articulation in some cases) of one of the consonants to the other.[17] First let us take /kam+(ɯ)#no/ 'bite?, will bite' (a ghost segment is parenthesised) as an example and see if the constraint ranking we have established so far permits either deletion or assimilation to resolve the unacceptable cluster of consonants. Here is a tableau for /kam+(ɯ)#no/ 'bite?, will bite'.

(19) Tableau for /kam+(ɯ)#no/ 'bite?, will bite' in casual speech

| Input: /kam+(ɯ)#no/ | CODA COND | M-PARSE (tense) | IDENT-ONS (place) | ANCHOR (Open) | IDENT (place) | MAX (Open) | MAX $_{\text{INIT}}$-C |
|---|---|---|---|---|---|---|---|
| a. ☞ kamɯno | | | | | | | |
| b. kamo | | | | | | | *! |
| c. kanno | | | | | *! | | |
| d. kano[18] | | | | *! | | * | |
| e. kammo | | | *! | | * | | |
| f. kamno | *! | | | | | | |

[17] Insertion of a vowel between the two consonants is not an option because, if a vowel needs to be inserted there, then the ghost segment should surface.

[18] When a ghost segment does not surface, it is not considered to be deleted. Therefore, a candidate without the root-final segment and the ghost segment does not violate ALIGN-SFX[2].

If the ghost segment does not surface, a CODACOND violation has to be resolved (i) by changing the place of articulation of one of the consonants at the root-suffix boundary, as in (19c) and (19e), or (ii) by deleting one of the consonants at the root-suffix boundary, as in (19b) and (19d). However, (i) incurs at least an IDENT-IO(place) violation and (ii) at least one of ANCHOR-IO(Open), MAX-IO(Open) and $\text{MAX}_{\text{INIT}}$-C-IO violations, while the candidate with the ghost segment (19a) does not violate any of them. This applies to any non-coronal consonant when followed by /(ɯ)#no/, with the exception of /w/, which is deleted before a non-low vowel. Let us thus examine what happens when the ghost segment follows /w/. Here is a tableau for /kaw+(ɯ)#no/ 'buy?, will buy' (M-PARSE (tense) is omitted as none of the candidates violates it).

(20) Tableau for /kaw+(ɯ)#no/ 'buy?, will buy' in casual speech

| Input: /kaw+(ɯ)#no/ | CODA COND | *wV [-low] | ID-ONS (place) | ANCHOR (Open) | IDENT (place) | MAX (Open) | ONS | IDENT (nasal) |
|---|---|---|---|---|---|---|---|---|
| a. kaɯno | | | | * | | *! | * | |
| b. ☹ kanno | | | | | * | | | * |
| c. kano | | | | * | | *! | | |
| d. kajɯno | | | *! | | * | | | |
| e. kawɯno | | *! | | | | | | |
| f. kawno | *! | | | | | | | |

In this tableau, the actual output (20a) is not only beaten by (20b) but also by (20c) so we need some constraints to eliminate these unwanted candidates before (20a) is ousted by ONSET. In Chapter 2 we saw that /g/ is realised as [ŋ] intervocalically (e.g. /kagi/ → [kaŋi] 'key') and that root-final /b/ surfaces as [n] in the formation of the *te*-form (e.g. /tob+te/ → [tonde] 'flying, jumping'). We also saw in 5.2.3 that /ɾ/ can undergo nasal assimilation. However, /w/ → [n] is not attested in Modern Japanese.[19] Judging from these facts, it seems that an underlying [+continuant] segment cannot surface as a nasal. I thus propose the following undominated local conjunction constraint to militate against /w/ → [n]:[20]

[19] It does not seem that /w/ → [n] was attested in Classical Japanese either. See Kishida (1998:ch.3).

[20] MAX-IO[+cont] does not work because /w/ surfaces as [t] in the formation of the *te*-form (e.g. /kaw+te/ → [katte] 'buying'). See Chapter 2, 2.3.2.

(21) Constraint 36

**[IDENT-IO(nasal) & IDENT-IO(cont)]**: Corresponding segments must agree on the values for [nasal] and/or [cont].

[IDENT-IO(nasal) & IDENT-IO(cont)] is violated only when corresponding segments involve a violation of both IDENT-IO(nasal) and IDENT-IO(cont). In /kaw+(ɯ)#no/ → *[kanno] (20b) both members of the local conjunction constraint are violated by /w/ → [n], so this candidate will be eliminated in the first stratum.

Now for *[kano] (20c); in Japanese, there are a number of forms of verbs because polarity, tense, voice and a variety of aspects are indicated by means of inflection, and when it comes to consonant-final root verbs, any form that is considered to be a word must have at least one more mora than its root projects because consonant-final root verbs always require a suffix or suffixes in order to be recognised as a grammatical word[21] due to undominated CODACOND (e.g. [kakɯ] (non-past affirmative form; bimoraic) > /kak/ 'write' (projecting one mora)[22] + non-past tense morpheme /ɯ/). I thus propose the following constraint:

(22) Constraint 37

**GRWD>ROOT(Open)**: In open class a grammatical word must have at least one more mora than its root projects.[23]

This constraint is violable because a vowel-final root verb can be a grammatical word by itself (e.g. [mi] (nominal form) > /mi/ 'see, watch'). However, as long as it does not dominate **WT-IDENT-IO(Open)** (no lengthening or shortening of segments in open class),[24] which is ranked in the third stratum, then a violation of GRWD>ROOT(Open) is not fatal for such a candidate as [mi] for /mi/, as seen in the following tableau:

---

[21] My definition of a 'grammatical word' is a 'minimal unit that is recognised as a word' which is separated from affixes underlyingly by #.

[22] We cannot assume that the root-final consonant also projects a mora because an underlying representation is not supposed to be syllabified and there is no guarantee that the consonant surfaces as a coda.

[23] The specification 'open' is necessary because /simaw/ in /te#simaw+ɯ/ 'end up –ing, for instance, violates GRWD>ROOT. See Chapter 4, 4.3 for detailed discussion on this.

[24] WT-IDENT-IO(Open) is a variation of McCarthy's (1995) **WT-IDENT-IO**. We will discuss these two constraints and their interaction with other constraints in detail in Chapter 6 when we examine compensatory lengthening.

(23) Tableau for /mi/ ‘seeing, watching’

| Input: /mi/ | DEP-V-IO | GRWD>ROOT (Open) | WT-IDENT-IO (Open) | ONSET | WT-IDENT-IO |
|---|---|---|---|---|---|
| a. ☞ mi | | * | | | |
| b. mi: | | | * | | *! |
| c. mii | *! | | | * | |

In the case of /w/-final root verbs, /w/ is deleted when followed by a non-low vowel due to undominated *wV[-low] so that, in order to satisfy GRWD>ROOT(Open), at least one mora-carrying segment of the suffix that follows must surface to form a grammatical word. In /kaw+(ɯ)#no/ → *[kano] (20c), [ka] cannot be recognised as a grammatical word, thus it violates GRWD>ROOT(Open). Let us add [IDENT-IO(nasal) & IDENT-IO(cont)] and GRWD >ROOT(Open) to Tableau (20) to confirm that this time the actual output [kaɯno] is correctly selected as optimal for /kaw+(ɯ)#no/ ‘buy?, will buy’.

(24) Tableau for /kaw+(ɯ)#no/ ‘buy?, will buy’ in casual speech (revised)

| Input: /kaw+ (ɯ)#no/ | CODA COND | *wV [-low] | ID(nas) & ID(cont) | ID-ONS (place) | ANCHOR (Open) | ID (pl) | MAX (Op) | GRWD >ROOT |
|---|---|---|---|---|---|---|---|---|
| a. ☞ kaɯno | | | | | * | | * | |
| b. kanno | | | *! | | | * | | |
| c. kano | | | | | * | | * | *! |
| d. kajɯno | | | | *! | | * | | |
| e. kawɯno | | *! | | | | | | |
| f. kawno | *! | | | | | | | |

With the addition of two new constraints, we can confirm that a ghost segment is needed when preceded by a /w/-final root verb as well. Therefore, we must conclude that all the verbs with a root-final non-coronal consonant require the ghost segment to surface.

### 5.3.2 Ghost Segment Preceded by /s/

Unlike the non-coronal consonants we have just discussed above, /s/ shares the same place of articulation with /n/ so that at least IDENT-IO(place) violation will be avoided if one of the consonants at the root-suffix boundary assimilates to the other in order to avoid a CODA

CODA COND violation. Let us check if either assimilation or deletion is an option for /s/-final root verbs when followed by /(ɯ)#no/. Here is a tableau for /kas+(ɯ)#+no/ 'lend?, will lend'.

(25) Tableau for /kas+(ɯ)#no/ 'lend?, will lend' in casual speech[25]

| Input: /kas+(ɯ)#no/ | CODA COND | ID(cont) [cor] | ID(nas) & ID(cont) | MAX[+obs] [cor] | GRWD >ROOT | MAX (Open) | MAX $_{\text{INIT}}$-C |
|---|---|---|---|---|---|---|---|
| a. ☞ kasɯno | | | | | | | |
| b. kaso | | | | | | | *! |
| c. kano | | | | *! | * | * | |
| d. kasso | | *! | * | | | | |
| e. kanno | | *! | * | | | | |
| f. kasno | *! | | | | | | |

As we saw in Chapter 2, 2.3.3, both IDENT-IO(cont)[cor] and MAX-IO[+obs][cor] are undominated and cannot be violated, so that candidates with /s/~[n] or /n/~[s] alternation (25d-e) or without /s/ (25c) are all eliminated in the first stratum of the constraint hierarchy. The candidate without /n/ of /no/ (25b) is not successful either because it violates MAX$_{\text{INIT}}$-C-IO. This leaves the actual output [kasɯno] (25a) alone in the contention, thus it is duly selected as optimal. Therefore, the ghost segment /(ɯ)/ must surface when preceded by /s/-final root verbs as well.

[25] Further to fn.14, the undominated constraints in (25) also eliminate all the candidates with /s/~[n] or /n/~[s] alternation or without /s/ for /kas+i#nasa+i/ 'lend!'. *[kasasai] cannot be eliminated by any of the undominated constraints in (25), but it fatally violates another undominated constraint ALIGN-SFX[2] as well as MAX$_{\text{INIT}}$-C-IO. Although the actual output [kaʃinasai] violates IDENT-IO(anterior) in order to satisfy CVLINKAGE(I), this violation is so trivial it has no effect on the selection of the optimal candidate.

| Input: /kas+i#nasa+i/ | ALIGN-SFX[2] | CODA COND | CV LINKAGE | IDENT-IO (cont)[cor] | IDENT-IO(nas) & IDENT-IO(cont) | MAX-IO [+obs][cor] | IDENT-IO (anterior) |
|---|---|---|---|---|---|---|---|
| a. ☞ kaʃinasai | | | | | | | * |
| b. kassasai | | | | *! | * | | |
| c. kannasai | | | | *! | * | | |
| d. kasinasai | | | *! | | | | |
| e. kasnasai | | *! | | | | | |
| f. kasasai | *! | | | | | | |
| g. kanasai | *! | | | | | * | |

### 5.3.3 Ghost Segment Preceded by /t/

As we saw in Chapter 2, 2.2.1, the *ta*-column consonant has surface variation and when /t/ is followed by /ɯ/, it surfaces as [ts] in order to satisfy undominated CVLINKAGE(*TU) (Itô & Mester 1995b) at the expense of an IDENT-IO(strident) violation. Let us see what option our constraint ranking prefers for /kat+(ɯ)#no/ 'win?, will win'. (Some constraints are omitted from the tableaux in this subsection in order to save space.)

(26) Tableau for /kat+(ɯ)#no/ 'win?, will win' in casual speech

| Input: /kat+(ɯ)#no/ | CODA COND | MAX[+obs] [cor] | MAX (Open) | MAX INIT-C | ID-ONS (nasal) | ID (nas) | ID (stri) | *STRUC |
|---|---|---|---|---|---|---|---|---|
| a. katsɯno | | | | | | | * | ***! |
| b. kato | | | | *! | | | | ** |
| c. kano | | *! | * | | | | | ** |
| d. katto | | | | | *! | * | | ** |
| e. ☹ kanno | | | | | | * | | ** |
| f. katno | *! | | | | | | | ** |

In this tableau *[kanno] (26e) is incorrectly selected as optimal. In Chapter 2, 2.4, we ranked both IDENT-IO(nasal) and IDENT-IO(strident) in the same stratum. If we place the former higher in the constraint hierarchy than the latter, then we will be able to select the actual output [katsɯno] (26a) as the winner, but this solution does not work when it comes to /kat+i#nasa+i/ 'win!', as seen in the following tableau:

(27) Tableau for /kat+i#nasa+i/ 'win!' in casual speech

| Input: /kat+i#nasa+i/ | ALIGN -SFX[2] | CODA COND | MAX (Open) | MAX INIT-C | ID (ant) | ID-ONS (nasal) | ID (nas) | ID (stri) |
|---|---|---|---|---|---|---|---|---|
| a. katʃinasai | | | | | *! | | | * |
| b. katasai | *! | | | * | | | | |
| c. kanasai | *! | | * | | | | | |
| d. kattasai | | | | | | *! | * | |
| e. ☹ kannasai | | | | | | | * | |
| f. katnasai | | *! | | | | | | |

In Chapter 3, 3.3, we saw /tabe+te#i+ɾɯ/ → [tabeteɾɯ] 'be eating', where MAX-IO(Root) is violated. In order for [tabeteɾɯ] to beat *[tabetʃiɾɯ] which satisfies MAX-IO(Root), we must rank IDENT-IO(anterior) higher than MAX-IO(Root). MAX-IO(Root) dominates *ɾ, which in turn dominates IDENT-IO(nasal) (see Chapter 4, (38) and Chapter 5, 5.2.1, respectively); by transitivity, IDENT-IO(anterior) must dominate IDENT-IO(nasal). Therefore, even if we promote IDENT-IO(nasal) above IDENT-IO(strident), we still cannot obtain [katʃinasai] (27a) for /kat+i#nasa+i/ 'win!' with our current constraint hierarchy. This suggests that there is a constraint ranked higher than IDENT-IO(anterior), which *[kannasai] fatally violates. In Japanese, an alternation of a voiced obstruent with a nasal is well attested (e.g. /tob+te/ → [tonde] 'flying, jumping', /kagi/ → [kaŋi] 'key') but an alternation between a voiceless obstruent and a nasal is not. In Chapter 2, we ranked both IDENT-IO(voice) (McCarthy & Prince 1995) and IDENT-IO(nasal) quite low in the constraint hierarchy, but the violation of both constraints by a single segment seems fatal for any candidate with the alternation between a voiceless obstruent and a nasal. I thus propose the following local conjunction constraint to account for the lack of alternation between /t/ and /n/.

(28) Constraint 38

**[IDENT-IO(voice) & IDENT-IO(nasal)]**: Corresponding segments must agree on the values for [voice] and/or [nasal].[26]

This local conjunction constraint is not violated by /b/ → [n] or /g/ → [ŋ] because IDENT-IO(voice) is satisfied, but it is violated by /t/ → [n] and /s/ → [n] (also by nasals → voiceless obstruents). Thus, (27e) as well (26d-e) and (27d) can be eliminated by this constraint. Let us add [IDENT-IO(voice) & IDENT-IO(nasal)] to Tableaux (26) and (27) to confirm that this time the actual outputs [katsɯno] and [katʃinasai] are correctly selected and that the ghost segment must surface when it is preceded by /t/.

[26] IDENT-IO(nasal)[cor] does not work because in casual speech root-final /ɾ/ can surface as [n] as seen in /kaeɾ+ana+i/ → [kaennai] 'not return'.

(29) Tableau for /kat+(ɯ)#no/ 'win?, will win' in casual speech (revised)

| Input: /kat+(ɯ)#no/ | CODA COND | IDENT(voice) & IDENT(nasal) | MAX[+obs] [cor] | MAX (Open) | MAX ${}_{\text{INIT}}$-C | IDENT-ONS (nasal) |
|---|---|---|---|---|---|---|
| a. ☞ katsɯno | | | | | | |
| b. kato | | | | | *! | |
| c. kano | | | *! | * | | |
| d. katto | | *! | | | | * |
| e. kanno | | *! | | | | |
| f. katno | *! | | | | | |

(30) Tableau for /kat+i#nasa+i/ 'win!' in casual speech (revised)

| Input: /kat+i#nasa+i/ | ALIGN -SFX[2] | CODA COND | IDENT(voice) & IDENT(nasal) | MAX (Open) | MAX ${}_{\text{INIT}}$-C | IDENT (ant) | IDENT (stri) |
|---|---|---|---|---|---|---|---|
| a. ☞ katʃinasai | | | | | | * | * |
| b. katasai | *! | | | | * | | |
| c. kanasai | *! | | | * | | | |
| d. kattasai | | | *! | | | | |
| e. kannasai | | | *! | | | | |
| f. katnasai | | *! | | | | | |

In the last three subsections, we have seen that, when the root-final consonant is /b/, /m/, /w/, /t/, /s/, /g/ or /k/, neither deletion nor nasalisation/denasalisation takes place across the root-suffix boundary and that the ghost segment must surface to avoid a CODACOND violation. Therefore, they all satisfy newly introduced [IDENT-IO(voice) & IDENT-IO (nasal)] for non-voicing/non-devoicing and non-nasalisation/non-denasalisation. Next, let us see what happens when /ɾ/ precedes a ghost segment.

### 5.3.4 Ghost Segment Preceded by /ɾ/

In casual speech /ɾ/ surfaces as [n] when followed by /ana+i/ (negation), /i#nasa+i/ (command) and /(ɯ)#no/ (question/assertion). Flap nasalisation does not involve either an IDENT-IO(voice) violation or an IDENT-IO(cont) violation, and neither the root-final /ɾ/ nor the morpheme-initial /n/ is deleted, so that the actual output of /ɾVnV/ can satisfy all the undominated and high-ranking constraints, including newly introduced [IDENT-IO(voice) &

IDENT-IO(nasal)], [IDENT-IO(nasal) & IDENT-IO(cont)] and GRWD>ROOT(Open), even when the V between the flap and the nasal does not surface.[27] In Tableau (16) we saw that [kaennai] and [jannai] were selected as optimal for /kaeɾ+ana+i/ 'not return' and /jaɾ+i#nasa+i/ 'do!', respectively, but [hainno] was not selected as optimal for /haiɾ+ɯ#no/ 'enter?, will enter' due to a violation of undominated M-PARSE(tense). Let us see what happens when we consider the tense morpheme to be a ghost segment. Here is a tableau for /haiɾ+(ɯ)#no/ 'enter?, will enter'.

(31) Tableau for /haiɾ+(ɯ)#no/ 'enter?, will enter' in casual speech

| Input: /haiɾ+(ɯ)#no/ | CODA COND | ANCHOR (Open) | GRWD >ROOT | ID (lat) | MAX (Open) | MAX $_{\text{INIT}}$-C | MAX (Root) | *ɾ | ID (nas) |
|---|---|---|---|---|---|---|---|---|---|
| a. haiɾɯno | | | | | | | | *! | |
| b. ☞ hainno | | | | | | | | | * |
| c. haiɾo | | | | | | *! | | * | |
| d. haillo | | | | *!* | | | | | * |
| e. haino | | *! | * | | * | | * | | |
| f. haiɾno | *! | | | | | | | * | |

In this tableau the crucial role is played by *ɾ. We saw in Chapter 4 that labials and flaps are systematically avoided in casual Japanese speech. Although flaps are not deleted from open-class items or roots due to ANCHOR-IO(Open), MAX-IO(Open) and MAX-IO(Root) all dominating *ɾ, avoidance of flaps still manifests itself through flap nasalisation, as can be seen in the above tableau.

In this section we examined cases of the ghost segment preceded by a root-final consonant, except for /n/, and confirmed that unless the ghost segment directly follows a flap, it must surface to avoid all the undominated and high-ranking constraints. In the next section we will discuss why contraction does not occur to a root-final /n/ followed by /ana+i/ (negation), /i#nasa+i/ (command) or /(ɯ)#no/ (question/assertion).

[27] /haiɾ+(ɯ)#no/ → [hainno] 'entre?, will enter', for instance, satisfies GRWD>ROOT(Open) because the flap surfaces as a coda which is a mora carrier. Also, it does not incur a violation of M-PARSE(tense) because /ɯ/ is not considered to be deleted even when it does not surface.

## 5.4 NO-CASUAL-MERGER

As mentioned earlier, CODACOND is not violated when /n/ directly precedes another /n/. Therefore, it is expected in casual speech that the initial vowel of each suffix, including the ghost segment, does not surface in such words as /sin+ana+i/ 'not die', /sin+i#nasa+i/ 'die!' and /sin+(ɯ)#no/ 'die?, will die'[28] due to *STRUC. However, this is not the case and, even in casual speech, these words surface as [ʃinanai], [ʃininasai] and [ʃinɯno], respectively. The problem is that our constraint ranking opts for candidates without the initial vowel of the suffix, whether it is a ghost segment or not, as seen in the following tableaux (some undominated and low-ranking constraints are omitted):

(32) Tableaux for /sin+a+na+i/ 'not die' and /sin+(ɯ)#no/ 'die?, will die' in casual speech

| Input: /sin₁+an₂a+i/ | CV LINKAGE | MAX-IO (Open) | MAX$_{INIT}$-C-IO | IDENT-IO (anterior) | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. ʃinanai | | | | * | | ****! | |
| b. ☹ ʃinnai | | | | * | | *** | * |
| c. ʃin$_2$ai | | *! | | * | * | *** | * |
| d. ʃin$_1$ai | | | *! | * | * | *** | * |
| e. sinanai | *! | | | | | **** | |
| f. sinnai | *! | | | | | *** | * |

| Input: /sin$_1$+(ɯ)#n$_2$o/ | CV LINKAGE | MAX-IO (Open) | MAX$_{INIT}$-C-IO | IDENT-IO (anterior) | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| g. ʃinɯno | | | | * | | ***! | |
| h. ☹ ʃinno | | | | * | | ** | * |
| i. ʃin$_2$o | | *! | | * | * | ** | * |
| j. ʃin$_1$o | | | *! | * | * | ** | * |
| k. sinɯno | *! | | | | | *** | |
| l. sinno | *! | | | | | ** | * |

The actual outputs, [ʃinanai] (32a) and [ʃinɯno] (32g), and the incorrectly selected candidates, *[ʃinnai] (32b) and *[ʃinno] (32h), are even until they reach *STRUC but, due to one more violation marks incurred by the former, the latter become optimal in the above

[28] In Japanese there is only one verb with root-final /n/: /sin/ 'die'.

tableaux. In the same way, *[ʃinnasai] will be selected as optimal, instead of [ʃininasai] for /sin+i#nasa+i/ 'die!'. ([ʃinnai], [ʃinnasai] and [ʃinno] are in fact the surface forms of /siɾ+ana+i/ 'not know', /siɾ+i#nasa+i/ 'know!' and /siɾ+(ɯ)#no/ 'know?, will know', respectively.) We desperately need a constraint that can oust such candidates as (32b) and (32h) before the actual outputs are eliminated by *STRUC, but what can that constraint be?

Yamato vocabulary has a number of homophones;[29] some share the same underlying representation (e.g. [hana] for /hana/ 'flower' and 'nose') while others do not (e.g. [katte] for /kat+te/ 'winning', /kaɾ+te/ 'cutting, mowing' and /kaw+te/ 'buying/).[30] Therefore, it does not appear that Japanese has such a phonological phenomenon as 'homophony blocking' (Crosswhite 1999). However, if we take a close look at formal-casual correspondence, we can start to see 'homophony blocking'. Here are some examples.

(33) No formal-casual merger

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | nagaɾa | naŋaɾa | naŋaɾa | 'while' |
| | naɾa | naɾa | naɾa | 'if' |
| b. | nomi | nomi | nomi | 'only' |
| | no | no | no | genitive particle |
| | ni | ni | ni | dative/locative/allative particle |

We accounted for VVN (Voiced Velar Nasalisation) by invoking the constraint ranking: *[ŋ >> *g >> IDENT-IO(nasal) (see Chapter 2, 2.2.3). In standard Japanese, intervocalic /g/ surfaces as [ŋ] so that no violation of *g is incurred in (33a), but because the velar in question is intervocalic, its nasalisation incurs a violation of IDENT-ONSET-IO(nasal), which dominates *ɾ (see 5.2.1), thus, dominates MAX-C-IO as well, and the candidate with no violation of *g and IDENT-ONSET-IO(nasal), *[naɾa] (34c), should beat both [naŋaɾa] (34a) and *[nagaɾa] (34b), as seen in the following tableau:

[29] If we include Sino-Japanese vocabulary, the number of homophones will be boosted dramatically.
[30] When taking the pitch into consideration, 'flower' ($LH^{-L}$) and 'nose' ($LH^{-H}$) are not quite homophonous because the first pitch of any morpheme suffixed to 'flower' is low (LH-L) while that to 'nose' is high (LH-H) due to floating pitch. Also, /kaw+te/ (LHH) has a different pitch pattern from the other two (HLL).

(34) Tableau for /nagaɾa/ 'while' in casual speech

| Input: /nagaɾa/ | *g | IDENT-ONSET -IO(nasal) | MAX$_{FIN}$-C-IO | *ɾ | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. naŋaɾa | | *! | | * | | *** | |
| b. nagaɾa | *! | | | * | | *** | |
| c. ☹ naɾa | | | | * | * | ** | * |
| d. na | | | *! | | ** | * | ** |

Also, the fact that /nomi/ surfaces as [nomi] (33b), not *[no] or *[ni], cannot be explained with our current constraint ranking because the rightmost consonant in a closed-class item is only protected by MAX$_{FIN}$-C-IO or MAX-C-IO, both of which are ranked lower than *LAB. Here is a tableau for /nomi/ 'only'.

(35) Tableau for /nomi/ 'only' in casual speech

| Input: /nomi/ | IDENT-ONSET -IO(place) | ONSET | *LAB | MAX$_{FIN}$-C-IO | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. nomi | | | *! | | | ** | |
| b. ☹ no | | | | * | * | * | * |
| c. ☹ ni | | | | * | * | * | * |
| d. noi | | *! | | * | * | ** | |
| e. noni | *! | | | | | ** | |

Due to a *LAB violation, [nomi] should never be optimal and either *[no] or *[ni] should be the surface form of /nomi/.[31] How, then, can [nomi] be optimal? We need a constraint that outranks *LAB, and it is an anti-homophony constraint which I call **NO-CASUAL-MERGER**.

(36) Constraint 39

**NO-CASUAL-MERGER** (NCM): For $S_1$ and $S_2$ that belong to the same part of speech, if $S_1 \neq S_2$ in formal speech, then $S_1 \neq S_2$ in casual speech.

When $S_1$ and $S_2$ are two items of the same part of speech and are not phonetically identical in formal speech, then their respective surface forms in casual speech should also not be

[31] If we replace *STRUC with the *V subhierarchy, [no] will be selected as optimal.

phonetically identical. Conjunctive particles /nagaɾa/ 'while' and /naɾa/ 'if' surface faithfully to their respective underlying representations in formal speech where MAX-C-IO outranks both *g and IDENT-ONSET-IO(nasal), and similarly an adverbial particle /nomi/ 'only' and the genitive particle /no/ (or the dative/locative/allative particle /ni/) surface as they are in formal speech because MAX-C-IO dominates *LAB. Therefore, /nagaɾa/ and /naɾa/ are not phonetically identical in formal speech, and /nomi/ and /no/ (or /ni/) are not either, thus NO-CASUAL-MERGER prohibits /nagaɾa/ and /nomi/ from merging with /naɾa/ and /no/ (or /ni/), respectively, in casual speech.

As mentioned earlier in this section, there are a number of homophones in formal Japanese speech which do not share the same underlying representation, and these homophones are still homophonous in casual speech. The difference between such homophones and the words we are currently dealing with is that the former have already merged at the surface level of formal speech (37.ii) while the latter have not (37.i) and, therefore, the former do not violate NO-CASUAL-MERGER but the latter do if they merge at the surface level of casual speech.

(37) Violation and non-violation of NO-CASUAL-MERGER

i. Violation (items of the same part of speech)

| | Underlying | Surface (formal) | Surface (casual) | Gloss | Merged with |
|---|---|---|---|---|---|
| a. | nagaɾa | naŋaɾa | *naɾa | 'while' | /naɾa/ 'if' |
| b. | nomi | nomi | *no | 'only' | genitive particle /no/ |
| c. | nomi | nomi | *ni | 'only' | dative/locative/allative particle /ni/ |

ii. Non-violation (items of the same part of speech)

| | Underlying | Surface (formal) | Surface (casual) | Gloss | Merged with |
|---|---|---|---|---|---|
| a. | hana | hana | hana | 'nose' | /hana/ 'flower' |
| b. | kaw+te | katte | katte | 'buying' | /kat+te/ 'winning' |
| c. | kaɾ+te | katte | katte | 'cutting, 'mowing' | /kat+te/ 'winning' |

iii. Non-violation (items of different parts of speech)[32]

| | Underlying | Surface (formal) | Surface (casual) | Gloss | Merged with |
|---|---|---|---|---|---|
| a. | te#i+ɾɯ | teiɾɯ | teɾɯ | 'be –ing' | /teɾ+ɯ/ 'shine' |
| b. | te#ok+ɯ | teokɯ | tokɯ | '(do) in advance' | /tok+ɯ/ 'solve' |
| c. | te#oɾ+ɯ | teoɾɯ | toɾɯ | 'be –ing (HUMBLE)' | /toɾ+ɯ/ 'take, get' |
| d. | te#aɾ+ɯ | teaɾɯ | taɾɯ | 'have been (done)' | /taɾ+ɯ/ 'suffice' |

(37.iii) are examples of mergers between items of different parts of speech. The vowel-initial auxiliary verbs preceded by /te/ and the full verbs in (37.iii) are not phonetically identical in formal speech but they merge in casual speech. However, because they belong to different parts of speech, no violation of NO-CASUAL-MERGER is incurred by the former. When the part of speech is different, it is very unlikely for the listener to take one word for the other as the function of the former within a sentence differs from the latter. When the part of speech is the same, on the other hand, a merger of two or more words will definitely cause the listener confusion.

(38) Non-merger of items of the same part of speech

| | | | |
|---|---|---|---|
| i. | a. | asob+i#nagaɾa | 'while playing' |
| | b. | asob+i#naɾa | 'if it is a play' |
| ii. | a. | anata#nomi#des+ɯ | 'It is only you.' |
| | b. | anata#no#des+ɯ | 'It is yours.' |
| | c. | anata#ni#des+ɯ | 'It is for you.' |

Even when homophony is unavoidable in formal speech, homophones are quite often differentiated by pitch (e.g. /jom+te/ → [jonde] (HLL) 'reading' vs. /job+te/ → [jonde] (LHH) 'calling'; /kaki/ → [kaki] (HL) 'oyster' vs. /kaki/ → [kaki] ($LH^{L}$) 'hedge' vs. /kaki/ → [kaki] ($LH^{H}$) 'persimmon'; /ki+nouɯ/ → [kino:] (HLL) 'function' vs. /kinoo/ → [kino:] (LHL) 'yesterday' vs. /ki+nouɯ/ → [kino:] (LHH) 'induction'). If further mergers are allowed as the formality of speech shifts from formal to casual, (i) there will be too

[32] See Chapter 3 for syncope observed in the *te*-form followed by vowel-initial auxiliary verbs.

many homophones for the pitch to handle and (ii) morphemes whose pitch is determined by the preceding morpheme, such as particles, will have no way of being differentiated, as seen in (38). It is not hard to assume that the language does not tolerate further mergers in casual speech in order not to increase the number of homophones.

However, NO-CASUAL-MERGER is not an undominated constraint because /ɾɯ#no/ '(do)?, will (do)' and /N#no/ '(will) not (do)' (see 5.5.1) and some compound verbs[33] can merge in casual speech, yet as long as it is ranked higher than any *C constraint (i.e. *LAB, *g or *ɾ), a formal-casual merger by means of consonant-vowel (or vowel-consonant) deletion can be prevented. I assume for the time being that NO-CASUAL-MERGER is ranked in the third highest stratum in the constraint hierarchy. Here are revised tableaux of (34) and (35) with NO-CASUAL-MERGER (NCM).

(39) Tableau for /nagaɾa/ 'while' in casual speech (revised)

| Input: /nagaɾa/ | NCM | *g | IDENT-ONSET -IO(nasal) | $\text{MAX}_{\text{FIN}}$- C-IO | *ɾ | MAX- C-IO | *STRUC | MAX- V-IO |
|---|---|---|---|---|---|---|---|---|
| a. ☞ naŋaɾa | | | * | | * | | *** | |
| b. nagaɾa | | * | | | * | | *** | |
| c. naɾa | *! | | | | * | * | ** | * |
| d. na | *! | | | * | | ** | * | ** |

N.B. *[naɾa] and *[na] merge with a conjunctive particle /naɾa/ 'if' and a sentence-final particle /na/ (prohibition/command/impressiveness), respectively.

(40) Tableau for /nomi/ 'only' in casual speech (revised)

| Input: /nomi/ | IDENT-ONS -IO(place) | NCM | ONSET | *LAB | $\text{MAX}_{\text{FIN}}$- C-IO | MAX- C-IO | *STRUC | MAX- V-IO |
|---|---|---|---|---|---|---|---|---|
| a. ☞ nomi | | | | * | | | ** | |
| b. no | | *! | | | * | * | * | * |
| c. ni | | *! | | | * | * | * | * |
| d. noi | | | *! | | * | * | ** | |
| e. noni | *! | | | | | | ** | |

N.B. *[no] and *[ni] merge with the genitive particle /no/ and the dative/locative/allative particle /ni/, respectively.

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[33] Examples include: [ɸɯkkakeɾɯ]~[ɸɯkkakeɾɯ] 'overcharge', [ɸɯkikakeɾɯ]~[ɸɯkkakeɾɯ] 'blow upon'; [çikkomɯ]~[çikkomɯ] 'draw back', [çikikomɯ]~[çikkomɯ] 'bring around' (see Chapter 9, 9.4.2).

Let us return to /sin+ana+i/ → [ʃinanai]/*[ʃinnai] 'not die', etc. If /sin+ana+i/ surfaces as *[ʃinnai] in casual speech, it will end up being homophonous to the casual form of /siɾ+ana+i/ 'not know'.

(41) /sin/ 'die' and /siɾ/ 'know' in the non-past negative form

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | sin+ana+i | ʃinanai | ʃinanai | 'not die' |
| b. | siɾ+ana+i | ʃiɾanai | ʃinnai | 'not know' |

In formal speech, these two full verbs are not homophonous in the non-past negative form so that they must not be homophonous in casual speech either in order to satisfy NO-CASUAL-MERGER. The question is: why is it /siɾ/ 'know', not /sin/ 'die', that goes through reduction despite the fact that [ʃinnai] is a lot more faithful to /sin+ana+i/ than to /siɾ+ana+ i/? There are two possible reasons. The first reason is frequency; according to the National Institute of Japanese Language (1962), /siɾ/ 'know' is the 86th most frequently used word while /sin/ 'die' is ranked No.419.5, and it is a cross-linguistic fact that high-frequency words are more susceptible to reduction than low-frequency words (Pierrehumbert 2002). The second reason is the difference between the number of verbs with root-final /ɾ/ and that with root-final /n/. As mentioned earlier, there is only one verb in Japanese with root-final /n/ (i.e. /sin/ 'die') but there are as many as 40 verbs with root-final /ɾ/ among the 1000 most frequently used words (National Institute of Japanese Language 1962). It is rather absurd to assume that, while all the other verbs with root-final /ɾ/ can undergo flap nasalisation when followed by /Vn/, one of the most frequently used verbs, /siɾ/ 'know', resists the process just to give way to /sin/ 'die'.

In Tableau (32), *[ʃinnai] is selected as optimal for /sin+ana+i/ 'not die' because it incurs one less violation marks in the *STRUC column than the actual output [ʃinanai]. Let us add NO-CASUAL-MERGER (NCM) to the tableau to confirm that [ʃinanai] is correctly selected this time.[34]

(42) Tableau for /sin+ana+i/ 'not die' in casual speech (revised)

| Input: /sin₁+an₂a+i/ | CV LINK | NCM | MAX (Open) | MAX INIT-C | IDENT (anterior) | MAX -C | *STRUC | MAX -V |
|---|---|---|---|---|---|---|---|---|
| a. ☞ ʃinanai | | | | | * | | **** | |
| b. ʃinnai | | *! | | | * | | *** | * |
| c. ʃin₂ai | | | *! | | * | * | *** | * |
| d. ʃin₁ai | | | | *! | * | * | *** | * |
| e. sinanai | *! | | | | | | **** | |
| f. sinnai | *! | | | | | | *** | * |

N.B. *[ʃinnai] merges with /siɾ+ana+i/ 'not know'.

## 5.5 RELATED ISSUES

### 5.5.1 Flap Nasalisation in /ɾɯ/ + /n/-Initial Morphemes

Flap nasalisation can also be observed in casual speech when a /n/-initial morpheme follows /ɾɯ/ (the non-past tense morpheme for vowel-final root verbs), as seen in the following examples:[35]

(43) Flap nasalisation

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | tabe+ɾɯ#no | tabeɾɯno | tabenno | 'eat?, will eat' |
| b. | tabe+te#i+ɾɯ#no | tabeteiɾɯno | tabetenno | 'be eating?, be eating' |
| c. | tabe+te#i+ɾɯ#no#da[36] | tabeteiɾɯnoda | tabetenda | 'be eating' |

[34] NO-CASUAL-MERGER also prevents /sin+i#nasa+i/ 'die!' and /sin+(ɯ)#no/ 'die?, will die' from merging with /siɾ+i#nasa+i/ 'know!' and /siɾ+(ɯ)#no/ 'know?, will know' exactly in the same way as for /sin+ana+i/ 'not die'.

[35] The /n/-initial morphemes that can follow /ɾɯ/ are limited to particles, such as /na/ (negative command) and /naɾa/ 'if'.

[36] The explanatory predicate /no/ followed by the copula /da/ is used when the speaker gives more information about something both the speaker and the listener share the knowledge of.

The contraction of /ɾɯ#no/ is quite common when it follows an auxiliary verb /i/ 'be –ing', as seen in (43b) and (43c). However, the contraction is less common when it is directly preceded by a full verb, such as /tabe/ 'eat' (43a). It is very likely that this is due to avoidance of a merger with /N#no/ 'not (do)?, will not (do)'.[37] The negation of /tabe+ɾɯ/ 'eat', for instance, is normally /tabe+na+i/ 'not eat' but, as mention in Chapter 2, fn.5, it can be /tabe+N/ so that, for those who do use /tabe+N/, /tabe+ɾɯ#no/ and /tabe+N#no/ can theoretically merge in casual speech. On the other hand, the negation of /te#i+ɾɯ/ 'be –ing' is always /te#i+na+i/ (I personally cannot imagine any speaker of standard Japanese would ever say /te#i+N/), thus the contraction does not incur a NO-CASUAL-MERGER violation. This is the reason why the contraction of /te#i+ɾɯ#no/ 'be –ing?, be –ing', as seen in (43b) and (43c), is not avoided. In this subsection, therefore, let us focus on the contraction of /te#i+ɾɯ#no/.

In (43b) and (43c), a combined process of syncope and flap nasalisation is observed, which can be accounted for in a derivational theory as follows:

(44) Derivational theoretical analysis of syncope/flap nasalisation

| | /tabe+te#i+ɾɯ#no/ | /tabe+te#i+ɾɯ#no#da/ |
|---|---|---|
| vowel deletion 1 | tabeteɾɯno | tabeteɾɯnoda |
| vowel deletion 2 | n/a | tabeteɾɯnda |
| vowel deletion 3 | tabeteɾno | tabeteɾnda |
| flap nasalisation | tabetenno | tabetennda |
| nasal deletion | n/a | tabetenda |
| | [tabetenno] | [tabetenda] |

Within the framework of OT, vowel deletion 1, vowel deletion 2, and flap nasalisation can be ascribed to ONSET, *STRUC and *ɾ, respectively. Vowel deletion 3 is also due to *STRUC but, because M-PARSE(tense) requires at least the final vowel of a tense morpheme

[37] Even when a merger takes place, these two expressions usually require other expressions that can differentiate the meaning between them, so that there is no chance that the listener would take one for the other (e.g. /nani+ka#tabe+ɾɯ#no/ → [nankatabenno] 'do you eat something?'; /nani+mo#tabe+N#no/ → [nammotabenno] 'don't you eat anything?').

to be parsed (see Chapter 2, 2.2.1), the third vowel deletion rule poses a problem. First, let us put /tabe+te#i+ɾɯ#no/ 'be eating?, be eating' to the test and see what happens.

(45) Tableau for /tabe+te#i+ɾɯ#no/ 'be eating?, be eating' in casual speech

| Input: /tabe+te# i+ɾɯ#no/ | CODA COND | M-PARSE (tense) | ONSET | MAX-IO (Root) | *ɾ | IDENT-IO (nasal) | *STRUC |
|---|---|---|---|---|---|---|---|
| a. tabetenno | | *! | | * | | * | **** |
| b. ☹ tabeteɾɯno | | | | * | * | | ***** |
| c. tabeteiɾɯno | | | *! | | * | | ****** |
| d. tabeteinno | | *! | * | | | * | ***** |
| e. tabeteɾno | *! | * | | * | * | | **** |
| f. tabeteiɾno | *! | * | * | | * | | ***** |

[tabetenno] (45a) is eliminated in the first stratum because it violates M-PARSE(tense), and the candidate with full parsing of the tense morpheme [tabeteɾɯno] (45b) is selected as optimal. This candidate can actually be heard in semi-formal speech but (45a) is far more commonly used than (45b) in casual speech. Therefore, we must treat (45a) as the actual output. In order for (45a) to become optimal, a violation of M-PARSE(tense) needs to be avoided, and there are two possible ways to do so. One is to consider that M-PARSE(tense) is satisfied as long as a part of the tense morpheme is realised. The other is to consider that /ɯ/ in /ɾɯ/ is a ghost segment, just like /ɯ/ when followed by /no/. Let us consider for the time being that the latter is the right option[38] and examine the contraction observed in /tabe+te#i+ɾ(ɯ)#no#da/ 'be eating' next (note the parentheses around /ɯ/ to indicate that it is now considered as a ghost segment).

In /tabe+te#i+ɾ(ɯ)#no#da/, both /ɾ/ and /n/ are protected by $\text{MAX}_{\text{INIT}}$-C-IO so neither should be deleted at the surface level, which makes the nasal deletion rule in (44) problematic. As seen in the following tableau, neither [tabeten$_1$da] (46c) nor [tabeten$_2$da] (46d) can be selected as optimal for /tabe+te#i+ɾ$_1$(ɯ)#n$_2$o#da/.

[38] We will return to this issue in the next subsection.

(46) Tableau for /tabe+te#i+ɾ(ɯ)#no#da/ ‘be eating’ in casual speech

| Input: /tabe+te#i+ $ɾ_1$(ɯ)#$n_2$o#da/ | ALIGN -SFX[2] | CODA COND | M-PARSE (tense) | MAX $_{\text{INIT}}$-C | ONS | MAX (Root) | *ɾ | ID (nas) |
|---|---|---|---|---|---|---|---|---|
| a. ☹ tabeteɾɯnda | | | | | | * | * | |
| b. tabeteiɾɯnoda | | | | | *! | | * | |
| c. tabeten$_1$da | | | | *! | | * | | * |
| d. tabeten$_2$da | *! | | * | * | | * | | |
| e. tabetennda[39] | | *! | | | | * | | * |
| f. tabeteɾnoda | | *! | | | | * | * | |
| g. tabeteiɾnoda | | *! | | | * | | * | |

In order for [tabetenda] to be selected as optimal, at least MAX$_{\text{INIT}}$-C-IO needs to be satisfied, and the only way to do so is to consider that /ɾ/ and /n/ coalesce to [n] at the expense of a **UNIFORMITY-IO**[40] violation.

(47) Constraint 40

**UNIFORMITY-IO**: No coalescence (McCarthy & Prince 1995).[41]

In order for [tabetenda] with /ɾ/ and /n/ having coalesced to beat [tabeteɾɯnda] (46a), UNIFORMITY-IO must be outranked by *ɾ. However, as we do not have enough evidence to establish the exact ranking of this constraint at this stage, I rank it in the same stratum as IDENT-IO(nasal) for now.[42] Here is a revised tableau of (46) with UNIFORMITY-IO.

[39] *[tabetennda] also violates *COMPLEX.

[40] Or ***MC** (no multiple correspondence; Lamontagne & Rice 1995).

[41] UNIFORMITY-IO is also violated by /si/ → [ʃ] as in /te#simaw+ɯ/ → [tʃaɯ] ‘end up –ing’ (see Chapter 4 (16-18)). *[tʃiaɯ] does not violate UNIFORMITY-IO. However, because it incurs multiple violations of ONSET, which dominates UNIFORMITY-IO, there is no chance that it can beat the actual output [tʃaɯ].

| Input: /te#simaw+ɯ/ | IDENT-ONSET -IO(place) | IDENT-IO (place) | ONSET | *LAB | MAX- C-IO | UNIFORMITY -IO | MAX- V-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ tʃaɯ | | | * | | ** | * | * |
| b. tʃimaɯ | | | * | *! | * | | * |
| c. teʃimaɯ | | | * | *! | * | | |
| d. tʃiaɯ | | | **! | | ** | | * |
| e. tʃajɯ | *! | * | | | * | * | * |
| f. tʃinaɯ | *! | * | * | | * | | * |

[42] This will be revised in Chapter 7, 7.2.2, when we discuss vowel coalescence.

(48) Tableau for /tabe+te#i+ɾ(ɯ)#no#da/ 'be eating' in casual speech (revised)

| Input: /tabe+te#i+ ɾ$_1$(ɯ)#n$_2$o#da/ | AL-SFX[2] | CODA COND | M-P (tense) | MAX $_{\text{INIT}}$-C | ONS | MAX (Root) | *ɾ | ID (nas) | UNIF |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ tabeten$_{12}$da | | | | | | * | | * | * |
| b tabeteɾɯnda | | | | | | * | *! | | |
| c. tabeteiɾɯnoda | | | | | *! | | * | | |
| d. tabeten$_1$da | | | | *! | | * | | * | |
| e tabeten$_2$da | *! | | * | * | | * | | | |
| f. tabetennda | | *! | | | | * | | * | |
| g. tabeteɾnoda | | *! | | | | * | * | | |
| h. tabeteiɾnoda | | *! | | | * | | * | | |

By considering [n] as the output correspondent of both /ɾ/ and /n/, the candidate with nasal coalescence (48a) is correctly selected as optimal for /tabe+te#i+ɾ(ɯ)#no#da/ 'be eating' in this tableau.

### 5.5.2 Flap Nasalisation in /ɾe/ + /d/-Initial Morpheme

In addition to the cases we have dealt with so far, the flap can be nasalised before /d/ in some contexts, as seen in the following examples:[43]

(49) Flap nasalisation before /d/

| | Underlying | Surface (formal) | Surface (informal) | Gloss |
|---|---|---|---|---|
| a. | so+ɾe#de | soɾede | sonde | 'so' |
| b. | so+ɾe#da#kaɾa | soɾedakaɾa | sondakaɾa | 'because of that' |
| c. | ko+ɾe#dake | koɾedake | kondake | 'only this (much)' |

/ɾe/ is a closed-class morpheme attached to demonstrative affixes to make demonstrative pronouns (e.g. /ko+ɾe/ 'this one', /so+ɾe/ 'that one'). Let us see which candidate our constraint ranking selects as optimal for each of the above.

[43] The flap in /ɾe/ also undergoes nasalisation when followed by a /n/-initial morpheme (e.g. /so+ɾe#naɾa/ → [sonnaɾa] 'if so').

(50) Tableaux for /so+ɾe#de/ 'so', /so+ɾe#da#kaɾa/ 'because of that' and /ko+ɾe#dake/ 'only this (much)' in casual speech

| Input: /so+ɾe#de/ | CODA COND | NOVOI GEM | MAX INIT-C | *ɾ | IDENT (nasal) | MAX -C | *STRUC | MAX -V |
|---|---|---|---|---|---|---|---|---|
| a. ☞ sonde | | | | | * | | ** | * |
| b. soɾede | | | | *! | | | *** | |
| c. sode | | | *! | | | * | ** | * |
| d. sodde | | *! | | | | | ** | * |
| e. soɾde | *! | | | * | | | ** | * |

| Input: /so+ɾe#da#kaɾa/ | CODA COND | NOVOI GEM | MAX INIT-C | *ɾ | IDENT (nasal) | MAX -C | *STRUC | MAX -V |
|---|---|---|---|---|---|---|---|---|
| f. ☞ sondakaɾa | | | | * | * | | **** | * |
| g. soɾedakaɾa | | | | **! | | | ***** | |
| h. sodakaɾa | | | *! | * | | * | **** | * |
| i. soddakaɾa | | *! | | * | | | **** | * |
| j. soɾdakaɾa | *! | | | ** | | | **** | * |

| Input: /ko+ɾe#dake/ | CODA COND | NOVOI GEM | MAX INIT-C | *ɾ | IDENT (nasal) | MAX -C | *STRUC | MAX -V |
|---|---|---|---|---|---|---|---|---|
| k. ☞ kondake | | | | | * | | *** | * |
| l. koɾedake | | | | *! | | | **** | |
| m. kodake | | | *! | | | * | *** | * |
| n. koddake | | *! | | | | | *** | * |
| o. koɾdake | *! | | | * | | | *** | * |

Due to the domination of IDENT-IO(nasal) by *ɾ, all three tableaux opt for the candidates with flap nasalisation. A question arising from this process is: if it is the case that the flap in /ɾe/ can be nasalised before /d/ to avoid a *ɾ violation, will the flap in the non-past tense morpheme /ɾɯ/ also be nasalised when followed by /d/? The answer is no.

(51) No flap nasalisation before /d/[44]

| Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|
| tabe+te#i+ɾɯ#dake | tabeteiɾɯdake | tabeteɾɯdake | 'be only eating' |

[44] I believe that /dake/ 'only' is the only closed-class item with initial /d/ that can directly follow a suffixed verb.

In the previous subsection we assumed that /ɯ/ in /ɾɯ/ is a ghost segment in casual speech and that M-PARSE(tense) will not be violated as long as /ɾ/ surfaces in some way. Let us thus assume that the underlying representation of [tabeteɾɯdake] is /tabe+te#i+ɾ(ɯ)# dake/ in casual speech and see if flap nasalisation is prevented in this context.

(52) Tableau for /tabe+te#i+ɾ(ɯ)#dake/ 'be only eating' in casual speech

| Input: /tabe+te# i+ɾ(ɯ)#dake/ | CODA COND | M-PARSE (tense) | ONSET | MAX-IO (Root) | *ɾ | IDENT-IO (nasal) |
|---|---|---|---|---|---|---|
| a. tabeteɾɯdake | | | | * | *! | |
| b. ☹ tabetendake | | | | * | | * |
| c. tabeteiɾɯdake | | | *! | | * | |
| d. tabateɾdake | *! | | | * | | |

Our constraint ranking incorrectly opts for the candidate with flap nasalisation (52b) due to *ɾ dominating IDENT-IO(nasal). In the discussion on Tableau (45), two possible ways for [tabetenno] to beat [tabeteɾɯno] for /tabe+te#i+ɾɯ#no/ 'be eating?, be eating' were proposed. One was to consider that the parsing of any segment in the tense morpheme /ɾɯ/ satisfies M-PARSE(tense) and the other was to consider the vowel in /ɾɯ/ is a ghost segment in casual speech. In Tableau (52) we adopted the second option and ended up selecting the incorrect candidate. However, even if we adopt the first option, (52b) will still be optimal because /ɾ/ in /ɾɯ/ is present as a nasal in the output, thus a violation of M-PARSE(tense) is not incurred. It appears that neither of the two options is adoptable, but if we assume that the tense morpheme has two allomorphs in casual speech, one used in contexts where a /n/-initial morpheme follows (e.g. /ɾ(ɯ)#no/ '(do)?, will (do)'; /ɾ(ɯ)#naɾa/ 'if (do)') and the other in all the other contexts (e.g. /ɾɯ#dake/ 'only (do)'; /ɾɯ#sika/ 'nothing but (do)'),[45] then we should still be able to account for both the reduction and the non-reduction of the tense morpheme.

[45] This is applicable to /ɯ/ (non-past tense morpheme for consonant-final root verbs) as well.

(53) /ɾ(ɯ)/~/ɾɯ/ alternation in casual speech

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | tabe+te#i+ɾ(ɯ)#no | tabetenno | 'be eating?, be eating' |
| b. | tabe+te#i+ɾɯ#dake | tabeteɾɯdake | 'be only eating' |

Let us, therefore, assume that [tabetenno] and [tabeteɾɯdake] have /ɾ(ɯ)/ and /ɾɯ/, respectively, as their underlying representation of the tense morpheme and that M-Parse (tense) requires the final vowel to surface when it is underlyingly present.[46] The following are revised tableaux of (45) and (52):

(54) Tableau for /tabe+te#i+ɾ(ɯ)#no/ 'be eating?, be eating' in casual speech

| Input: /tabe+te# i+ɾ(ɯ)#no/ | CODA COND | M-PARSE (tense) | ONSET | MAX-IO (Root) | *ɾ | IDENT-IO (nasal) |
|---|---|---|---|---|---|---|
| a. ☞ tabetenno | | | | * | | * |
| b. tabeteɾɯno | | | | * | *! | |
| c. tabeteiɾɯno | | | *! | | * | |
| d. tabeteinno | | | *! | | | * |
| e. tabeteɾno | *! | | | * | * | |
| f. tabeteiɾno | *! | | * | | * | |

(55) Tableaux for /tabe+te#i+ɾɯ#dake/ 'be only eating' in casual speech

| Input: /tabe+te# i+ɾɯ#dake/ | CODA COND | M-PARSE (tense) | ONSET | MAX-IO (Root) | *ɾ | IDENT-IO (nasal) |
|---|---|---|---|---|---|---|
| a. ☞ tabeteɾɯdake | | | | * | * | |
| b. tabetendake | | *! | | * | | * |
| c. tabeteiɾɯdake | | | *! | | * | |
| d. tabateɾdake | *! | * | | * | * | |

By assuming two allomorphs for the tense morpheme suffixed to vowel-final root verbs in casual speech, the different behaviours of the morpheme can now be accounted for.

[46] As mentioned in fn.27, when /ɯ/ in a tense morpheme does not surface, it is considered to be absent underlyingly. Therefore /ɾ(ɯ)/ → [n] does not incur a violation of M-PARSE(tense).

### 5.5.3 The Topic/Contrast Marker /wa/ Revisited

In Chapter 4, 4.2.2, we saw that the glide in the topic/contrast marker /wa/ is deleted when a closed-class item precedes it in casual speech, in spite of the fact that it is protected by high-ranking MAX$_{\text{INIT}}$-C-IO which dominates *LAB. However, if we assume that the glide becomes a ghost segment in casual speech, we may be able to solve the problem with this glide deletion. Let us see if this assumption works.

(56) Closed-class item + /wa/ vs. open-class item + /wa/[47]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | a+ɾe#wa | aɾewa | n/a | 'that (TOPIC)' |
| b. | a+ɾe#(w)a | n/a | aɾʲa | 'that (TOPIC)' |
| c. | haɾe#wa | haɾewa | n/a | 'fine weather (TOPIC)' |
| d. | haɾe#(w)a | n/a | haɾewa | 'fine weather (TOPIC)' |

In order to account for the above, we need the following constraint:

(57) Constraint 41

**ALIGN-R(Open)**: The right edge of an open-class item must coincide with the right edge of a syllable.

ALIGN-R(Open) is a variation of McCarthy & Prince's (1993a) ALIGN-R, with the specification of 'open'. It is freely violated when a consonant-final root verb is followed by a vowel-initial suffix (e.g. /kas+ɯ/ → [kasɯ] 'lend'; see Chapter 2 (1)) but is never violated elsewhere in Japanese.[48] In order to establish the exact ranking of this constraint, let us first assume that it is ranked in the same stratum as other class-specific constraints, such as ALIGN-L(Open), ANCHOR-IO(Open) and MAX-IO(Open), and draw a tableau for /kam+ana+i/ 'not bite'.

[47] We will deal with closed-class items with a final back vowel followed by /wa/ in Chapter 6, 6.4.

[48] As mentioned in Chapter 4, fn.12, Shibatani (1990:176) argues that open-class items followed by /wa/ can undergo contraction (e.g. /toɾi#wa/ → [toɾʲa] 'bird (TOPIC)'), but I stand by Miyara (1980:101) who dismisses this kind of contraction.

(58) Tableau for /kam+ana+i/ 'not bite' in casual speech

| Input: /kam+ana+i/ | ALIGN -SFX[2] | CODA COND | ID-ONS (place) | ALIGN-R(Open) | IDENT (place) | MAX (Open) | MAX $_{\text{INIT}}$-C | *LAB |
|---|---|---|---|---|---|---|---|---|
| a. kamanai | | | | * | | | | *! |
| b. ☹ kannai | | | | | * | | | |
| c. kamai | | | | | | | * | *! |
| d. kammai | | | *! | | * | | | ** |
| e. kamnai | | *! | | | | | | * |
| f. kanai | *! | | | | | * | | |

In this tableau the actual output [kamanai] (58a) is eliminated due to a *LAB violation. This indicates that ALIGN-R(Open) must be ranked lower than IDENT-IO(place), MAX-IO (Open), $\text{MAX}_{\text{INIT}}$-C-IO and so forth. I thus rank it in the same stratum as ONSET, which is just above *LAB.[49]

Let us check if the addition of ALIGN-R(Open) to our constraint ranking has any effect on our ghost segmental analysis that we have developed so far. We confirmed that a ghost segment must surface when the root-final consonant is not a flap in Tableaux (19) (/kam+(ɯ)#no/ → [kamɯno] 'bite?, will bite'), (24) (/kaw+(ɯ)#no/ → [kaɯno] 'buy?, will buy'), (25) (/kas+(ɯ)#no/ → [kasɯno] 'lend?, will lend') and (29) (/kat+(ɯ)#no/ → [katsɯno] 'win?, will win') and, because in each case the selection of the optimal candidate is complete after MAX-IO(Open) and $\text{MAX}_{\text{INIT}}$-C-IO evaluate candidates, ALIGN-R(Open) does not affect any of the results. When the root-final consonant is a flap, it surfaces as a coda consonant (Tableau (30); /haiɾ+(ɯ)#no/ → [hainno] 'enter?, will enter') so no violation of ALIGN-R(Open) is incurred. Therefore, ALIGN-R(Open) has no role to play when a ghost segment is in the underlying representation.

To return to the ghost segmental analysis of /wa/. Let us draw tableaux for /a+ɾe#wa/ 'that (TOPIC)' (56a) and /haɾe#wa/ 'fine weather (TOPIC)' (56c) in formal speech and for /a+ɾe#(w)a/ 'that (TOPIC)' (56b) and /haɾe#(w)a/ 'fine weather (TOPIC)' (56d) in casual speech (ANCHOR-IO(Open) is omitted).

[49] ALIGN-R(Open), ONSET >> *LAB will be confirmed in the second tableau in (60), in which the domination of *LAB by ALIGN-R(Open) is vital to the selection process.

(59) Tableaux for /a+ɾe#wa/ 'that (TOPIC)' and /haɾe#wa/ 'fine weather (TOPIC)' in formal speech

| Input: /a+ɾe#wa/ | MAX-V-IO | MAX-IO (Open) | MAX$_{INIT}$-C-IO | ALIGN-R (Open) | ONSET | *LAB | *STRUC |
|---|---|---|---|---|---|---|---|
| a. ☞ aɾewa | | | | | | * | *** |
| b. aɾ$^j$a | | | *! | | | | ** |
| c. aɾea | | | *! | | * | | *** |
| d. aɾa | *! | | * | | | | ** |

| Input: /haɾe#wa/ | MAX-V-IO | MAX-IO (Open) | MAX$_{INIT}$-C-IO | ALIGN-R (Open) | ONSET | *LAB | *STRUC |
|---|---|---|---|---|---|---|---|
| e. ☞ haɾewa | | | | | | * | *** |
| f. haɾ$^j$a | | | *! | * | | | ** |
| g. haɾea | | | *! | | * | | *** |
| h. haɾa | *! | * | * | * | | | ** |

(60) Tableaux for /a+ɾe#(w)a/ 'that (TOPIC)' and /haɾe#(w)a/ 'fine weather (TOPIC)' in casual speech[50]

| Input: /a+ɾe#(w)a/ | MAX-IO (Open) | MAX$_{INIT}$-C-IO | ALIGN-R (Open) | ONSET | *LAB | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. aɾewa | | | | | *! | *** | |
| b. ☞ aɾ$^j$a | | | | | | ** | |
| c. aɾea | | | | *! | | *** | |
| d. aɾa | | | | | | ** | *! |

| Input: /haɾe#(w)a/ | MAX-IO (Open) | MAX$_{INIT}$-C-IO | ALIGN-R (Open) | ONSET | *LAB | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| e. ☞ haɾewa | | | | | * | *** | |
| f. haɾ$^j$a | | | *! | | | ** | |
| g. haɾea | | | | *! | | *** | |
| h. haɾa | *! | | * | | | ** | * |

In formal speech /w/ in /wa/ is not a ghost segment and the deletion of /w/ incurs a violation of MAX$_{INIT}$-C-IO, thus any candidate without [w] has no chance of beating the actual outputs [aɾewa] 'that (TOPIC)' (59a) and [haɾewa] 'fine weather (TOPIC)' (59e). In

[50] In Chapter 4, 4.3 we ranked *LAB below ONSET instead of ranking both in the same stratum. If ONSET does not dominate *LAB, *[haɾ$^j$a] (60f) will incorrectly become the optimal candidate for /haɾe#(w)a/ 'fine weather (TOPIC)'.

casual speech, on the other hand, MAX$_{INIT}$-C-IO is not violated even if /w/ does not surface because, as a ghost segment, non-surfacing of /w/ is not considered as deletion of /w/, and [aɾʲa] 'that (TOPIC)' (60a) is correctly selected as optimal. In the tableau for /haɾe#(w)a/ 'fine weather (TOPIC)' in casual speech, the crucial role is played by ALIGN-R(Open). This constraint eliminates *[haɾʲa] (60f), which would be selected as optimal if it were not for ALIGN-R(Open).

In this subsection we confirmed that the assumption of the glide in the topic/contrast marker /wa/ as a ghost segment does work and that we no longer have to consider that the contraction of closed-class items followed by the topic/contrast marker in casual speech is an isolated case in which high-ranking MAX$_{INIT}$-C-IO is violated to give way to lower-ranking *LAB.

Let us now recapitulate the constraints introduced in this chapter and their positions in the constraint hierarchy for casual speech.

(61) Summary of constraints 3

a. Undominated
   i. M-PARSE(potential)
   ii. [IDENT-IO(nasal) & IDENT-IO(cont)]
   iii. [IDENT-IO(voice) & IDENT-IO(nasal)]

b. Dominated
   i. ALIGN-R(Open)
   ii. GRWD>ROOT(Open)
   iii. IDENT-ONSET-IO(nasal)
   iv. NO-CASUAL-MERGER
   v. UNIFORMITY-IO

(62) Constraint ranking 23

ALIGN-SFX², CODACOND, CVLINKAGE, IDENT-IO(cont)[cor], M-PARSE(tense), **M-PARSE(potential)**, MAX-IO[+obs][cor], *Nɾ, *wV[-low], **[IDENT-IO(nasal) & IDENT-IO(cont)]**, **[IDENT-IO(voice) & IDENT-IO(nasal)]**
>>
DEP-V-IO, IDENT-ONSET-IO(place)
>>
ANCHOR-IO(Open), **GRWD>ROOT(Open)**, IDENT-IO(lateral), IDENT-IO(place), MAX-IO(Open), MAX$_{INIT}$-C-IO, **NO-CASUAL-MERGER**
>>
**ALIGN-R(Open)**, IDENT-IO(anterior), ONSET, *g
>>
**IDENT-ONSET-IO(nasal)**, *LAB

>>

MAX-IO(Root), $\text{MAX}_{\text{FIN}}$-C-IO

>>

*ɾ

>>

IDENT-IO(nasal), IDENT-IO(strident), MAX-C-IO, **UNIFORMITY-IO**

>>

*STRUC

>>

MAX-V-IO

## 5.6 SUMMARY

The flap is one of the marked segments in Japanese and is often avoided by assimilating to a neighbouring nasal when deletion is not permitted. We confirmed that flap nasalisation is a regressive assimilation process[51] and that a flap assimilates to a nasal only when the first V in /ɾVnV/ belongs to a closed-class item and, thus, can be deleted.

The first case of flap nasalisation we dealt with is the one observed across a boundary of two closed-class items, namely, the potential/passive morpheme /ɾaɾe/ and the negative morpheme /na/. The deletion of the suffix-final vowel from /ɾaɾe/ only incurs very low-ranking MAX-V-IO, and the flap nasalisation in this context can be ascribed to another manifestation of flap avoidance.

The second case we dealt with is the one observed across a boundary of a /ɾ/-final root verb and a suffix/suffixes, such as /ana+i/ (negative), /i#nasa+i/ (command) or /ɯ#no/ (question/assertion). The deletion of the initial /a/ and the first /i/ from /ana+i/ and /i# nasa+i/, respectively, does not incur any serious violation but that of /ɯ/ from /ɯ#no/ fatally violates undominated M-PARSE(tense), thus we needed to find a way to account for this apparent disappearance of the tense morpheme. My proposal was to assume that in casual speech /ɯ/ becomes a ghost segment when followed by a /n/-initial particle, that this segment only surfaces in order to satisfy high-ranking constraints and that no violation of M-PARSE(tense) is incurred when it does not surface.

[51] Progressive nasal assimilation is prevented by IDENT-ONSET-IO(nasal), as discussed in 5.2.2.

When the root-final consonant is not a flap, a ghost segment always surfaces, so the first task was to make sure that our constraint ranking does select candidates with a ghost segment when preceded by a root-final consonant other than a flap. In doing so, we stumbled across a few problems, namely, (i) why /w/ and /n/ do not alternate, (ii) why /ɯ/ must surface when preceded by /w/, and (iii) why /t/ and /n/ do not alternate. To account for the lack of these alternations, I proposed two local conjunction constraints: [IDENT-IO(nasal) & IDENT-IO(cont)] and [IDENT-IO(voice) & IDENT-IO(nasal)], and for /w+(ɯ)/ → [ɯ], GRWD>ROOT(Open).

The biggest problem was posed by non-reduction of /sin/ 'die' followed by /VnV/. [VnnV] (e.g. [ʃinnai]) is a permissible cluster in Japanese and does not violate any high-ranking constraint; it even fares better than [VnVnV] (e.g. [ʃinanai]) when it come to *STRUC violations. In order to solve this problem, I proposed NO-CASUAL-MERGER, which militates against a merger of two items of the same part of speech in casual speech when they are not phonetically identical in formal speech, and, to support this proposal, I presented two other cases of no-casual-merger (i.e. /nagaɾa/ → [naŋaɾa]/*[naɾa] 'while', /nomi/ → [nomi]/*[no]/*[ni] 'only').

Flap nasalisation is a manifestation of flap avoidance in casual speech, and is frequently observed when a flap is followed by a nasal. In the last section of this chapter, however, we saw that a flap can not only assimilate to a nasal but also coalesce with a nasal in some contexts (e.g. /tabe+te#i+ɾɯ#no#da/ → [tabetenda] 'be eating') and, in order to account for this process, we needed to consider that the vowel in the non-past tense morpheme /ɾɯ/ is another ghost segment. In the same section, we also saw that flap nasalisation can be observed when /ɾV/ in a closed-class item is followed by /d/ as well (e.g. /so+ɾe#de/ → [sonde] 'so'), but not when the tense morpheme /ɾɯ/ is followed by /d/.

Also discussed in the last section is the contraction of closed-class items followed by the topic/contrast marker in casual speech. The apparent deletion of the glide in /wa/ is a violation of high-ranking constraint $\text{MAX}_{\text{INIT}}$-C-IO, but by assuming the glide as a ghost segment in casual speech, we could confirm that the contraction in question can be accounted for within the framework of OT.

In this chapter, I have discussed a number of cases of flap nasalisation and proposed that the following be considered as ghost segments in casual Japanese speech:

(63) Ghost segments in casual Japanese speech

a. The non-past tense morpheme /ɯ/ when followed by a /n/-initial particle.
b. The vowel of the non-past tense morpheme /ɾɯ/ when followed by a /n/-initial particle.
c. The glide in the topic/constraint marker /wa/.

The Japanese ghost segments manifest themselves through differences between formal and casual speech, and they are an essential element of flap nasalisation. By invoking the concept of ghost segments, we succeeded in accounting for flap nasalisation within the framework of OT.

# CHAPTER SIX

## COMPLENSATORY LENGTHENING

### 6.1 INTRODUCTION

Compensatory lengthening (CL) is a cross-linguistically common process, in which one segment becomes linked to the timing unit left empty by the delinking of a neighbouring segment (Clements 1986:39). In Japanese, as briefly mentioned in Chapter 4, fn.13 and fn.48, a combined process of labial deletion and glide formation quite often accompanies CL, as seen in /de#(w)a/[1] → [dʒa:] (locative/instrumental particle (or copula) + topic/contrast marker) and /keɾeba/ → [keɾʲa:]/[kʲa:] 'if'. Within the framework of OT, CL can be ascribed to **PARSE-μ** (McCarthy & Prince 1993a) at the expense of a **WT-IDENT-IO** (McCarthy 1995) violation. In this chapter, taking into consideration a number of non-OT analyses of CL by precursors, an attempt is made to account for CL observed in Japanese through the interaction of the above two conflicting faithfulness constraints.

### 6.2 CONTEXTS FOR CL IN JAPANESE

In Modern Japanese, I can think of the following six contexts in which CL appears to take place:

(1) Contexts for Compensatory lengthening

i. Closed-class items followed by the topic/contrast marker[2]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | so+ɾe#de#wa | soɾedewa | n/a | 'then, in that case' |
| | so+ɾe#de#(w)a | n/a | soɾedʒa: | 'then, in that case' |

[1] As discussed in Chapter 5, 5.5.3, I consider /(w)a/ (/w/ is a ghost segment) to be the underlying representation for the topic/contrast marker in casual speech.

[2] When /(w)a/ follows an open-class item, contraction does not take place in casual speech due to ALIGN-R (Open), thus CL does not take place either. Compare the following:

a. /so+ɾe#(w)a/ → [soɾʲa:] 'that one (Topic)' but /soɾe#(w)a/ → [soɾewa] 'swerving (Topic)'.

b. /ak+i#(w)a/ → [akʲa:] 'opening (Topic)' but /aki#(w)a/ → [akiwa] 'losing interest (Topic)'.

| | | | | |
|---|---|---|---|---|
| b. | jom+i#wa | jomiwa | n/a | ‘reading (Topic)’ |
| | jom+i#(w)a | n/a | jom$^j$a: | ‘reading (Topic)’ |
| c. | bokɯ#wa | bokɯwa | n/a | ‘I (Topic)’ |
| | bokɯ#(w)a | n/a | boka: | ‘I (Topic)’ |

ii. Conditional morphemes /eba/, /ɾeba/ and /keɾeba/ ‘if’[3]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | tob+eba | tobeba | tob$^j$a: | ‘if fly/jump’ |
| b. | ne+ɾeba | neɾeba | neɾ$^j$a: | ‘if sleep/go to bed’ |
| c. | na+keɾeba | nakeɾeba | nakeɾ$^j$a:/nak$^j$a: | ‘if not …’ |

iii. /iw+ɯ/ ‘say’[4]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | iw+ɯ | iɯ/jɯ: | jɯ: | ‘say’ |

iv. /o(+)o/ followed by particles with an initial voiceless stop

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | so+o+ka[5] | so:ka | sokka | ‘I see’ |
| b. | tabe+joo#to | tabejo:to | tabejotto | ‘(I think I) will eat’ |

v. /$V_1V_1$C[-voice, +obs]/ in adjective roots

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | tiisa+i | tʃi:sai | tʃissai/tʃittʃai | ‘small’ |
| b. | ooki+i | o:ki: | okki: | ‘big’ |

vi. /V+i/ in adjectives (vulgarisms)[6]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | deka+i | dekai | deke: | ‘huge’ |
| b. | sɯgo+i | sɯŋoi | sɯŋe: | ‘terrific, terrible’ |
| c. | samɯ+i | samɯi | sami: | ‘cold’ |

[3] When a w-final root verb is followed by /eba/ in casual speech, /e/ occupies an onset position by itself as [j] (e.g. /kaw+eba/ → [kaja:] ‘if buy’). Some phonologists (Miyara (1980) for one) assume /ɾeba/ for consonant-final root verbs as well as for vowel-final root verbs. See Chapter 9, 9.6 for discussion on related issues.

[4] /iw/ ‘say’ is the only verb root I can think of that has root-final /iw/. /iw+ɯ/ is given as the underlying representation for [jɯ:] but it will be revised in 6.8.

[5] I consider /so+o/, not /so+ɯ/, to be the underlying representation for [so:] ‘that way, that’s right’ for the reason that, even when it is pronounced slowly and/or carefully, it surfaces as [soo], not as [soɯ].

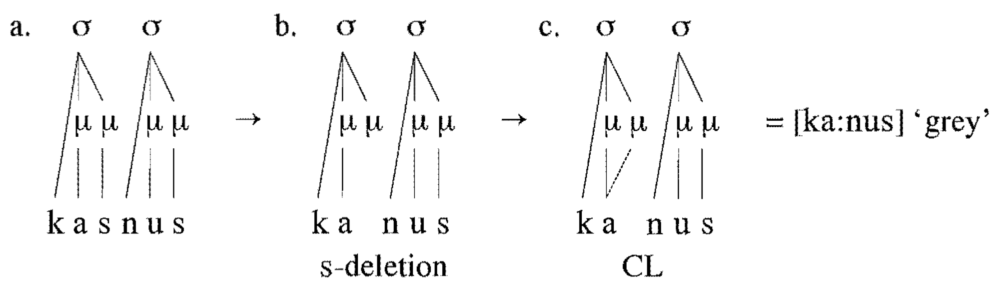
[6] An i-adjective root can end in /i/, /ɯ/, /o/ or /a/, but it does not seem that there is any i-adjective root with root-final /e/. Therefore, we cannot tell whether /e+i/ will surface as [e:] or [i:] in vulgarisms.

CL is optional in (1.i-ii), preferred in (1.iv), and obligatory in (1.iii, v-vi). In (1.i-iii), the labial is deleted and, in order to avoid an ONSET violation (e.g. [$k^j$a]~*[kea] 'if') and to fare better for MAX-V-IO (e.g. [$k^j$a]~*[ka] 'if'), glide formation takes place, then CL is induced to compensate for the loss of mora count. (1.iv) and (1.v) are examples of 'inverse CL' (Hayes 1989): a process in which a vowel is deleted/shortened with concomitant lengthening of the following consonant. In (1.vi) a back vowel and a high front vowel coalesce and surface as a long vowel, but this process is only observed in vulgarisms (Vance 1987) which are often used by men to express 'roughness'. Chapter 7, 7.4 will be solely dedicated to vulgarisms and they will be examined in detail, so let us focus on CL observed in (1.i-v) in this chapter.

### 6.3 WHEN CL DOES AND DOES NOT TAKE PLACE IN JAPANESE

CL takes place when reduction of mora count occurs by means of deletion or shortening of a moraic segment. Here is a classical case of CL.

(2) CL in Latin (Hayes 1989:262)




According to Fukui (1986) and Poser (1988), /iw+ta/ → [itta] 'said' is a case of CL triggered by deletion of a coda consonant. My interpretation of /iw+ta/ → [itta], however, is different in that /w/ surfaces as [t] in order to satisfy all the undominated and high-ranking constraints (see Chapter 2, 2.3.2)[7], thus /w/ is not deleted and the process in question is not a case of CL.[8] In Japanese, a non-geminate (either full or partial[9]) consonant

[7] Shibatani (1990:177) also considers /w/ → [t], which he describes as 'C-assimilation'.

[8] Fukui (1986) and Poser (1988) consider that /w/ in /iw+ta/ → [itta] 'said' is moraic. In Japanese, coda consonants are moraic but, as an underlying representation is not supposed to be syllabified, we cannot

cluster is created in the underlying representation only when a consonant-final root verb is followed by /te/ or /ta/ but, as we saw in Chapter 2, a root-final consonant always surfaces with the exception of /w/ followed by a non-low vowel. Therefore, the kind of CL described in (2) is non-existent in Japanese.

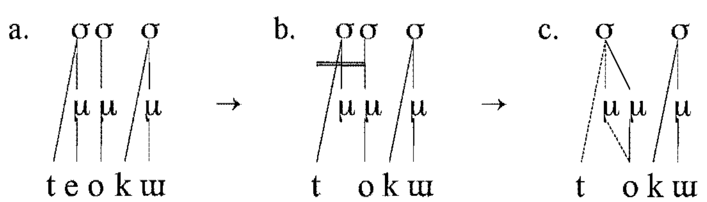
Next, let us consider a case of vowel deletion. Is CL triggered when a vowel is deleted in Japanese? In Chapter 3 we examined the syncope in the *te*-form followed by vowel-initial auxiliary verbs. Vowel deletion in this process involves a mora loss but the loss is never compensated for by means of lengthening of a neighbouring segment.

(3) Non-occurrence of CL in a syncope process

| | <u>Underlying</u> | <u>Surface</u> (formal) | <u>Surface</u> (casual) | <u>Gloss</u> |
|---|---|---|---|---|
| a. | te#i+ɾɯ | teiɾɯ | teɾɯ / *tellɯ / *te:ɾɯ | 'be –ing' |
| b. | te#ok+ɯ | teokɯ | tokɯ / *to:kɯ / *ttokɯ | '(do) in advance' |
| c. | te#age+ɾɯ | teaŋeɾɯ | taŋeɾɯ / *ta:ŋeɾɯ / *ttaŋeɾɯ | 'do (someone) the favour of –ing' |

If the timing slot linked to a deleted vowel had to be re-linked to a neighbouring segment and if leftward spread were the norm as Fukui (1986) argues, then we would expect /te#ok+ɯ/ '(do) in advance', for instance, to surface as *[to:kɯ].

(4) Expected CL for /te#ok+ɯ/ '(do) in advance'



= *[to:kɯ]

vowel deletion  CL

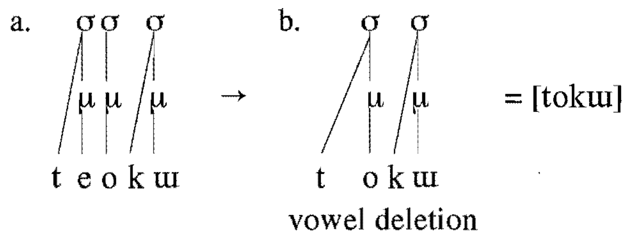
However, CL never takes place in the syncope process and this fact suggests that, when a vowel is deleted, the timing slot linked to the vowel is also deleted, as seen in the following:

---

assume that the /w/ is moraic. Once we consider that the /w/ surfaces as [t], however, whether it is moraic or not is of no relevance to our discussion.

[9] A partial geminate refers to a stop consonant preceded by a nasal homorganic to the stop (e.g. /mp/, /nd/).

(5) Non-occurrence of CL for /te#ok+ɯ/ '(do) in advance'




Vowel deletion is also observed in such words as /atataka+i/ → [attakai] 'warm', /anata/ → [anta] 'you', /mono/ → [moN] '(tangible) thing', /hoN+toɯ/ → [honto] 'truth, really', and /keɾedomo/ → [kedo] 'although', but such vowel deletion never accompanies CL.[10] Therefore, we should consider that, in Japanese, deletion of a moraic segment does not trigger CL.

If deletion of a moraic segment does not trigger CL, what triggers CL in Japanese? In (1) we saw six contexts in which CL appears to take place. (1.i), (1.ii) and (1.iii) involve glide formation, (1.iv) and (1.v) involve vowel shortening, and (1.vi) involve vowel coalescence. What is common to all three cases is that the segments linked to a timing slot in the underlying representation are never deleted in the surface form, whether they are still moraic or no longer moraic. Thus, I conclude that, in Japanese, CL takes place only when an output segment carries less mora count than its corresponding input segment.

So far I have assumed that underlying vowels are moraic.[11] I base my assumption on Hayes' argument:

> The general principle is that contrastive mora count, not length per se, is represented underlyingly. (...) The three-way contrast in the vocoid series /j/-/i/-/ii/ is represented as the distinction between zero, one and two moras, which is the same as the surface mora count of these segments (1989:258-259).

[10] Possible counterarguments to these cases of vowel deletion not accompanied by CL are: (i) in the first three examples no other vowel can be lengthened due to the No-Crossing constraint (or NoGap in OT) and none of the neighbouring consonants can be lengthened due to *Complex, (ii) in the first three examples the coda consonant carries the mora projected by the deleted vowel so that there is no loss of mora count, and (iii) in the last example gemination of /d/ is prohibited by undominated NoVoiGem. However, we still cannot account for non-occurrence of CL in /hoN+toɯ/ → [honto] 'truth, really' and that of CL after the syncope in /te#ok+ɯ/ '(do) in advance' and all the other auxiliary verbs preceded by the *te*-form.

[11] Within the framework of OT, CL has been dealt with by Lee (1996), Sprouse (1997), Goldrick (2000) and Kawahara (2001), among others, and they all seem to agree that underlying vowels project moras.

Japanese is a quantity-sensitive language and there is a contrast between short vowels and long vowels (e.g. /o/ (honorific prefix) vs. /oo/ (prefix meaning 'big'); /ie/ 'house' vs. /iie/ 'no'). Being a language with contrastive vowel length, therefore, we should consider that Japanese includes mora count in the underlying representation and that each underlying vowel projects one mora.

Glide formation does not involve either deletion or shortening of a segment, but it does involve a mora loss and CL can be triggered to preserve mora count.[12] (1.i) (i.e. contraction of closed-class items + /(w)a/) and (1.ii) (i.e. contraction of conditional morphemes) are some such examples in Japanese, so let us take a close look at these two cases in the next two sections.

## 6.4 CL IN THE CONTRACTION OF CLOSED-CLASS ITEMS + /(w)a/

In Chapter 4, 4.2.2, we discussed the contraction of /e#(w)a/ → [ja] and /i#(w)a/ → [ja], which is often accompanied by CL. As briefly mentioned in Chapter 4, fn.12, CL can also take place when /(w)a/ follows a closed-class item with a morpheme-final back vowel (e.g. /bokɯ#(w)a/ → [boka:] 'I (TOPIC)'). This section is thus dedicated to CL observed in the contraction of closed-class items followed by the topic/contrast marker /(w)a/.

When contraction takes place in closed-class items + /(w)a/, the choice between a form with CL and a form without CL seems to be completely up to the speaker, and he/she may opt for one on one occasion and the other on another occasion even when talking to the same person. Thus, CL in this context has nothing to do with the formality of speech and can be considered as optional.[13] First, let us see what predecessors have to say about this process.

Miyara (1980:112) argues that the contraction process in question involves not CL but regressive assimilation of the labial to [a].

[12] Glide formation accompanied by CL is cross-linguistically common. See Clements (1986:47) and Katamba (1989:124) for examples of LuGanda, and Hayes (1989:270) for examples of Ilokano, among others.

[13] This does not necessarily mean that one cannot have a range of formality with a single addressee. CL is optional, however, even when two people are talking in a less (or more) casual manner than they usually do.

(6) Miyara's analysis (1980:109-112)[14]

a. Vowel weakening: $[+\text{syll}] \rightarrow [-\text{syll}]/\ldots\_\_[+\text{low}][+\text{low}]_{\Phi})$

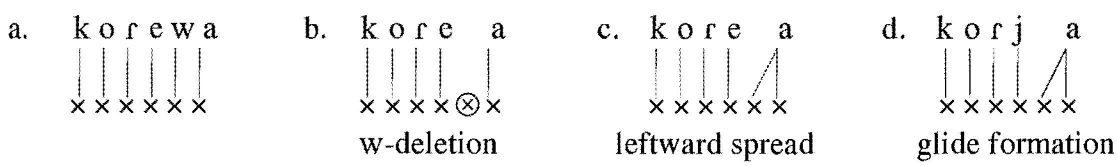
b. Regressive assimilation: $\text{w, j, b} \rightarrow \text{a}/(_{\Phi}\ldots[\ldots]_{\alpha}\_\_\text{a}_{\Phi})$

| | | |
|---|---|---|
| | /ko+ɾe#wa/ 'this (TOPIC)' | /koto#wa/ (nominaliser+topic) |
| regressive assimilation | koɾeaa | kotoaa |
| vowel weakening | koɾʲaa | kotwaa |
| w-deletion | n/a | kotaa |
| | [koɾʲaa] (or [koɾʲa:]) | [kotaa] (or [kota:]) |

Both Fukui (1986:361) and Poser (1986:185) dismiss Miyara's regressive assimilation rule by pointing out that this type of assimilation, especially /b/ → [a], is highly unlikely, with which I agree. Also, if [aa] is ascribed to regressive assimilation of /w/ to [a], then we will not be able to explain why [koɾʲa:] and [koɾʲa] co-exist in casual speech. Although Miyara is right in proposing the vowel weakening rule, his analysis is not adoptable.

Fukui (1986), who provides diagrams for /kaw+ta/ → [katta] 'bought' and /iw+ɯ/ → [jɯ:] 'say', does not provide diagrams for the process in question, but it is easily assumed that the following is what he has in mind:

(7) Fukui's analysis (based on his argument)




Fukui employs the term 'skeletal tier', which I believe refers to a 'full' one relevant to syllabification. He argues that w-deletion leaves a slot in the tier that needs to be re-linked. In (7a), however, /w/ seems to occupy an onset slot,[15] which is not linked to a timing slot, so that it is not plausible to assume that the slot left empty by w-deletion is re-linked to the

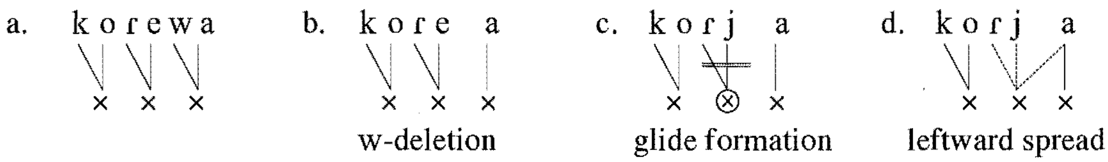
[14] Miyara's 'vowel weakening' is basically the same as 'glide formation'. The difference between [koɾʲaa] and [koɾʲa:] is that Miyara employs [aa] and I employ [a:] to indicate a long [a].

[15] As discussed in the previous section, there is a distinction between /w/ (non-moraic) and /ɯ/ (moraic) in Japanese (e.g. /jɯɯ+ai/ → [jɯ:ai]/*[jɯwai] 'friendship', /kɯwae+ɾɯ/ → [kɯwaeɾɯ]/*[kɯ:aeɾɯ] 'add up'). Therefore, we cannot assume that /w/ is linked to a timing slot in (7a).

following vowel. Also, as discussed earlier, a slot is deleted when the segment linked to it is deleted in Japanese, so that Fukui's analysis is not adoptable either.[16]

Poser (1988:497), on the other hand, argues that only coda feature deletion and glide formation leave a trace, thus his analysis is assumed to be as follows:

(8) Poser's analysis (based on his argument)




As far as this account is concerned, I utterly agree with Poser, but there is one difference; I consider the initial velar glide in /wa/ as a ghost segment in casual speech (see Chapter 5, 5.5.3) so that w-deletion is not involved in the process in question.

Let us account for /ko+ɾe#(w)a/ → [koɾʲa:] in terms of constraint interaction. Here, as we are dealing with glide formation, preservation of mora count and vowel lengthening, the following constraints are relevant to our discussion:[17]

(9) Constraints 42

a. **Wt-Ident-IO**: No lengthening or shortening of segments (McCarthy 1995).[18]

b. **Parse-μ**: Moras must be parsed (McCarthy & Prince 1993a).[19]

c. **No-Parse-μ(DelSeg)**: Moras carried by deleted segments must not be parsed.

Moras carried by deleted segments are never parsed in Japanese, thus No-Parse-μ(DelSeg) is considered to be undominated. As for the other two constraints, in order for CL to take place, Parse-μ must dominate Wt-Ident-IO (see (10a) below). Let us draw a comparative

[16] Fukui's analysis, just like Miyara's, cannot account for the co-existence of [koɾʲa:] and [koɾʲa] either.

[17] McCarthy (2002) proposes Ident-IO(vowel/glide) (i.e. do not change vowels into glide) to account for glide formation in Emai. However, as underlying high vowels and glides are not supposed to be distinguished in terms of syllabic roles, it does not seem appropriate to incorporate 'glide' into an Identity constraint. For this reason, I will attempt to account for glide formation in Japanese without employing Ident-IO(vowel/glide).

[18] Or **PresvW** (Preserve melodic weight; Samek-Lodovici 1992).

[19] Lee (1996) and Sprouse (1997) propose Max-IO(μ) and Maxμ, respectively, to account for CL. However, their proposed constraints are basically the same as Parse-μ.

tableau for /ko+ɾe#(w)a/ 'this (TOPIC)' to find out where they should be ranked in the constraint hierarchy (some constraints are omitted).

(10) Comparative tableau for /ko+ɾe#(w)a/ 'this (TOPIC)'

| Input: /ko+ɾe#(w)a/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | *STRUC | PARSE -μ | WT-IDENT-IO |
|---|---|---|---|---|---|---|
| a. koɾʲa: ~ koɾʲa | | | | | W | L |
| b. koɾʲa: ~ koɾewa | | | W | W | | L |
| c. koɾʲa: ~ koɾea | | W | | W | | L |
| d. koɾʲa: ~ koɾa: | W | | | | | |

already established

From (10b) we can confirm that WT-IDENT-IO must be ranked below *LAB but we are unable to establish the ranking of PARSE-μ because PARSE-μ is not violated by the actual output. Let us, this time, draw a comparative tableau for /keɾedomo/ 'although' in casual speech, the actual output of which does violate PARSE-μ.

(11) Comparative tableau for /keɾedomo/ 'although' in casual speech

| Input: /keɾedomo/ | NO-P-μ (DelSeg) | ONS | *LAB | MAX $_{\text{FIN}}$-C | *ɾ | MAX -C | *STR | PARSE -μ |
|---|---|---|---|---|---|---|---|---|
| a. kedo ~ keɾedo | | | | | W | L | W | L |
| b. kedo ~ kedomo | | | W | L | | L | W | L |
| c. kedo ~ keɾedomo | | | W | L | W | L | W | L |
| d. kedo ~ keedoo | | W | | | | | W | L |
| e. kedo ~ ke:do:[20] | W | | | | | | | L |

already established

Both [kedo] and [keɾedo] are observed in casual speech but the former is used far more frequently and, in order for the former to beat the latter, PARSE-μ needs to be ranked lower than *ɾ (see (11a)). Therefore, we can establish *ɾ >> PARSE-μ >> WT-IDENT-IO (from

[20] If we consider that [e:] and [o:] correspond /e(ɾ)e/ and /o(m)o/, respectively, then a violation of NO-PARSE-μ(DelSeg) will not be incurred. However, the reason why *[ke:do:] is never observed in speech is probably that there is a constraint which prohibits underlyingly non-adjacent vowels from surfacing as a long vowel (cf. Chapter 4, fn.43).

(10a) and (11a). I thus rank PARSE-μ between *ɾ and MAX-C-IO, and WT-IDENT-IO in the same stratum as MAX-C-IO for the time being.

(12) Constraint ranking 24

NO-PARSE-μ(DelSeg) >> *ɾ >> PARSE-μ >> MAX-C-IO, WT-IDENT-IO >> *STRUC

Let us confirm that the above constraint ranking can correctly select optimal candidates for /ko+ɾe#(w)a/ 'this (TOPIC)', in which CL can take place,[21] and /te#ik+ɯ/ '(do) gradually', in which CL cannot take place, in casual speech. (Constraints that none of the candidates violates and those that all the candidates violate equally are omitted from the tableaux in this chapter, together with some low-ranking constraints.)

(13) Tableau for /ko+ɾe#(w)a/ 'this (TOPIC)' in casual speech[22]

| Input: /ko+ɾe#(w)a/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | PARSE -μ | WT-IDENT-IO | *STRUC |
|---|---|---|---|---|---|---|
| a. ☞ koɾʲa: | | | | | * | ** |
| b. koɾʲa | | | | *! | | ** |
| c. koɾewa | | | *! | | | *** |
| d. koɾea | | *! | | | | *** |
| e. koɾa:[23] | *! | | | | * | ** |

(14) Tableau for /te#ik+ɯ/ '(do) gradually' in casual speech

| Input: /te#ik+ɯ/ | NO-PARSE-μ (DelSeg) | IDENT (ant) | ONS | MAX (Root) | PARSE -μ | WT-IDENT | *STRUC | MAX -V |
|---|---|---|---|---|---|---|---|---|
| a. ☞ tekɯ | | | | * | * | | ** | * |
| b. teikɯ | | | *! | | | | *** | |
| c. tʃikɯ | | *! | | | * | | ** | * |
| d. te:kɯ[24] | *! | | | * | | * | ** | * |
| e. tekkɯ | *! | | | * | | * | ** | * |

[21] We will discuss alternation between a form with CL and a form without CL (e.g.[koɾʲa:]~[koɾʲa]) in 6.7.

[22] Non-deletion of /ɾ/ is due to $\text{MAX}_{\text{FIN}}$-C-IO >> *ɾ. *[kollʲa] is another possible but not successful candidate because it violates undominated NOVOIGEM as well as IDENT-IO(lateral).

[23] If we consider that [a:] corresponds to both /e/ and /a/, (13e) will not violate NO-PARSE-μ(DelSeg) or WT-IDENT-IO, but will violate high-ranking **IDENT-IO(back)** (see Chapter 7, 7.2.1 for this constraint).

[24] If we consider that [e:] corresponds to /e#i/, (14d) will not violate NO-PARSE-μ(DelSeg), WT-IDENT-IO or MAXIMALITY constraints, but can be eliminated by high-ranking **$\text{IDENT}_{\text{INIT}}$-IO(height)** (see Chapter 9, 9.4.4 for this constraint).

In Chapter 4, fn.12, we briefly discussed the contraction of closed-class items with a morpheme-final back vowel followed by the topic/contrast marker. The following are some examples:

(15) Contraction of /ɯ#(w)a/, /o#(w)a/ and /a#(w)a/ in casual speech[25]

| | Underlying | Surface | Gloss | |
|---|---|---|---|---|
| a. | bokɯ#(w)a | boka: | 'I (TOPIC)' | ([boka] is acceptable.) |
| b. | ko+ko#(w)a | koka: | 'this place (TOPIC)' | ([koka] is acceptable.) |
| c. | anata#(w)a | anata: | 'you (TOPIC)' | (*[anata] is not acceptable.) |

We saw in (6) that, in accounting for /koto#wa/ → [kota:] (nominaliser + particle), Miyara (1980) provides a derivational theoretical analysis that involves regressive assimilation of /w/ to /a/ and vowel weakening, which is repeated below.[26]

(16) Miyara's analysis (1980:109-112)

| | |
|---|---|
| | /koto#wa/ (nominaliser+topic) |
| regressive assimilation | kotoaa |
| vowel weakening | kotwaa |
| w-deletion | kotaa |
| | [kotaa] (or [kota:]) |

We rejected his regressive assimilation rule earlier, but his vowel weakening (or glide formation) rule (e.g. /o/ → /w/, which is in line with /e/ → /j/) seems plausible and the w-deletion rule makes sense too in order to avoid CODACOND violation (cf. /kaw+ɯ/ → [kaɯ] 'buy'), although the vowel weakening has become opaque in the process in question.

Let us see how our constraint ranking evaluates contraction of closed-class items with a morpheme-final back vowel followed by /(w)a/. First, here is a tableau for /anata#(w)a/ 'you (TOPIC)' (15c).

[25] In (15a-b) the forms without CL is not as commonly used as those with glide formation, such as [soredʒa] 'then' and [nakʲa] 'if not'. (See (18) and (19) as well as 6.7 for further discussion on this.) In (15c) /anata#(w)a/ actually surfaces as [anta:] much more frequently than [anata:] to fare better in *STRUC.

[26] Neither Fukui (1986) nor Poser (1986, 1988) discusses contraction of closed-class items with a morpheme-final back vowel followed by the topic/contrast marker.

(17) Tableau for /anata#(w)a/ 'you (TOPIC)' in casual speech[27, 28]

| Input: /anata$_1$#(w)a$_2$/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | PARSE -μ | UNIFORMITY -IO | WT-IDENT-IO |
|---|---|---|---|---|---|---|
| a. ☞ anata$_{12}$: | | | | | * | |
| b. anata$_{12}$ | | | | *! | * | * |
| c. anata$_1$ | | | | *! | | |
| d. anata$_2$ | | | | *! | | |
| e. anatawa | | | *! | | | |
| f. anataa | | *! | | | | |
| g. anata$_1$: | *! | | | | | * |
| h. anata$_2$: | *! | | | | | * |

In Japanese, a sequence of two identical vowels is normally realised as a long vowel[29] so that no ONSET violation is incurred and, in (17), the actual output is selected as optimal. Next, let us examine how /bokɯ#(w)a/ 'I (TOPIC)' (15a) is assessed by our constraint ranking.

(18) Tableau for /bokɯ#(w)a/ 'I (TOPIC)' in casual speech

| Input: /bokɯ$_1$#(w)a$_2$/ | NO-PARSE-μ (DelSeg) | CODA COND | ONSET | *LAB | PARSE -μ | WT-IDENT-IO |
|---|---|---|---|---|---|---|
| a. boka$_2$: | *! | | | | | * |
| b. ☹ boka$_2$ | | | | | * | |
| c. bokɯwa | | | | *! | | |
| d. bokɯa | | | *! | | | |
| e. bokwa | | *! | | * | | |

In (18), as OT only takes into account the input-output correspondence, [boka$_2$:] (18a), which complies with Miyara's (1980) /ɯ/ → /w/ → Ø rules, is eliminated due to a violation of NO-PARSE-μ(DelSeg) and the form without CL (18b) is opted for by our constraint

[27] We ranked UNIFORMITY-IO in the same stratum as MAX-C-IO in Chapter 5, 5.5.1. This, however, will be reconsidered in Chapter 7, 7.2.2. (It will be demoted below WT-IDENT-IO.)
[28] The final [a] is a realisation of /a$_1$/ and /a$_2$/. If they do not surface as a long vowel with two moras, a WT-IDENT-IO violation will be incurred, as seen in (17b). The same is applied to the coalescence of /ɯ/ and /a/ to [a] in /bokɯ#(w)a/ → [boka:] 'I (TOPIC)' (see (19a)).
[29] LuGanda, in which CL triggered by glide formation is also observed, takes a different measure to deal with /a+a/ (and /V[-high]+V/). In this language, the first vowel is deleted then CL takes places to compensate for the mora loss (see Katamba 1989:171-172).

ranking. [boka] is acceptable and can be heard in casual speech, but its use is far less common than that of [boka:]. How, then, can we obtain [boka:] with our constraint ranking? If we consider that the final non-low back vowel of the closed-class item is deleted in this contraction, as Miyara (1980) argues, then any candidate without the vowel will have no chance of winning. Thus, I propose that the final non-low vowel in a closed-class item and /a/ in /(w)a/ coalesce to [a:]. Here is a revised tableau of (18).

(19) Tableau for /bokɯ#(w)a/ 'I (Topic)' in casual speech (revised)

| Input: /bokɯ$_1$ #(w)a$_2$/ | NO-P-μ (DelSeg) | CODA COND | ONSET | *LAB | PARSE -μ | UNIFORMITY -IO | WT-IDENT-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ boka$_{12}$: | | | | | | * | |
| b. boka$_{12}$ | | | | | *! | * | * |
| c. boka$_2$: | *! | | | | | | * |
| d. boka$_2$ | | | | | *! | | |
| e. bokɯwa | | | | *! | | | |
| f. bokɯa | | | *! | | | | |
| g. bokwa | | *! | | * | | | |

This time our constraint ranking correctly selects the candidate with CL. Whether the final vowel of a closed-class item is /ɯ/ or /o/, if we assume /V[+back, -low]#(w)a/ → [a:] as vowel coalescence, then CL in conjunction with the contraction of closed-class items and the topic/contrast marker can all be accounted for with the constraint ranking we have established so far.[30]

## 6.5 CONDITIONAL MORPHEMES

There are three conditional morphemes in Japanese: /eba/, /ɾeba/ and /keɾeba/. /eba/, /ɾeba/ and /keɾeba/ are suffixed to consonant-final verb roots, vowel-final verb roots and vowel-final suffixes, and adjective roots and the negative morphemes /ana/ and /na/, respectively. Here are some examples of the contraction of the conditional forms.

[30] Vowel coalescence does not take place when /(w)a/ follows an open-class item with a final back vowel (e.g. /hako#(w)a/ → [hakowa]/*[haka:] 'box (TOPIC)'). See also Chapter 5, 5.5.3 and fn.2 of this chapter.

(20) Contraction of conditional forms[31]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | tob+eba | tobeba | tob$^{j}$a: | 'if fly/jump' |
| b. | ne+ɾeba | neɾeba | neɾ$^{j}$a: | 'if sleep/go to bed' |
| c. | jom+e+ɾeba | jomeɾeba | jomeɾ$^{j}$a: | 'if can read' |
| d. | ik+ase+ɾeba | ikaseɾeba | ikaseɾ$^{j}$a: | 'if let/make (someone) go' |
| e. | jo+keɾeba | jokeɾeba | jok$^{j}$a: | 'if good' |
| f. | na+keɾeba | nakeɾeba | nak$^{j}$a: | 'if not …' |

NB: CL is optional in this contraction process.

In Chapter 4, 4.2.1, we ranked MAX$_{\text{INIT}}$-C-IO higher than *LAB so that a labial is protected from deletion when it is the leftmost consonant of a morpheme. The deletion of /b/ from /eba/, therefore, incurs a fatal violation of MAX$_{\text{INIT}}$-C-IO and we need to explain why [tob$^{j}$a:] (20a), for instance, can beat [tobeba] in casual speech. Here are some possible answers: (i) due to the combination of frequency effects and underpronunciation of labials; (ii) due to a distinct underlying representation only for casual speech (i.e. /ea/);[32] and (iii) due to OO-correspondence (Benua 1995, 1997) between /eba/ and the other two conditional morphemes.[33] However, an answer to the question that I offer in this thesis is a constraint that prohibits intervocalic [b] in closed-class items.[34]

(21) Constraint 43

***VbV(Closed)**: No intervocalic [b] in closed-class items.[35, 36]

---

[31] As discussed in Chapter 4, 4.6.2, /keɾeba/ → [keɾ$^{j}$a]/[keɾ$^{j}$a:] is occasionally observed in speech as well.

[32] The underlying representation cannot be /ja/ because, if neither glide formation nor vowel coalescence takes place, there will be nothing to trigger CL.

[33] Benua employs OO-correspondence to account for identity between a root and a root + an affix (or affixes) and between a word and its truncated form. However, I believe that we can extend her theory to accounting for identity between allomorphs as well.

[34] *LAB(Closed) does not work because it will end up deleting all the labials in closed-class items, including the ghost segment in /(w)a/ even when preceded by an open-class item (see Chapter 5, 5.5.3).

[35] As mentioned in Chapter 2, fn.35, a number of 'no intervocalic C' constraints have been proposed in OT (e.g. *VhV (McCarthy & Prince 1995), *VdV (ibid.), *VkV (Sprouse 1997), *VwV (Kager 1999)).

[36] The only closed-class item with an intervocalic /b/ I can think of that violates this constraint is a sentence-final particle /teba/ which expresses the speaker's irritation. The reason why it is not contracted to *[ta], *[te] or *[tʃa] is that we already have /ta/ (command), /te/ (confirmation/assertion) and /te#(w)a/ → [tʃa] (*te*-form+/(w)a/), all of which can be used sentence-finally. Thus, non-contraction of /teba/ can be considered to be another case of avoidance of a NO-CASUAL-MERGER violation.

Let us determine where in the constraint ranking *VbV(Closed) should be placed by employing comparative tableaux for /tob+eba/ 'if fly/jump', one for formal speech and the other for casual speech (MAX-V-IO and WT-IDENT-IO, as well as [tobʲa], are omitted).

(22) Comparative tableau for /tob+eba/ 'if fly/jump' in formal speech

| Input: /tob+eba/ | NO-P-μ (DelSeg) | ID-ONS (place) | MAX -C | MAX $_{\text{INIT}}$-C | ONS | *LAB | P-μ | *VbV (Cld) |
|---|---|---|---|---|---|---|---|---|
| a. tobeba ~ tobʲa: | | | W | W | | L | | L |
| b. tobeba ~ toba | | | W | W | | L | W | L |
| c. tobeba ~ tobea | | | W | W | W | L | | L |
| d. tobeba ~ tobeda | | W | | | | L | | L |
| e. tobeba ~ toba: | W | | W | W | | L | | L |

already established

(23) Comparative tableau for /tob+eba/ 'if fly/jump' in casual speech

| Input: /tob+eba/ | NO-P-μ (DelSeg) | ID-ONS (place) | MAX $_{\text{INIT}}$-C | ONS | *LAB | MAX -C | P-μ | *VbV (Cld) |
|---|---|---|---|---|---|---|---|---|
| a. tobʲa: ~ tobeba | | | L | | W | L | | W |
| b. tobʲa: ~ toba | | | | | | | W | |
| c. tobʲa: ~ tobea | | | | W | | | | |
| d. tobʲa: ~ tobeda | | W | L | | | L | | |
| e. tobʲa: ~ toba: | W | | | | | | | |

already established

If we assume that the position of *VbV(Closed) within the constraint hierarchy remains unchanged as the degree of formality shifts from formal to casual, then *VbV(Closed) must be ranked no higher than MAX$_{\text{INIT}}$-C-IO (from Tableau (22a-c)) but no lower than MAX$_{\text{INIT}}$-C-IO (from Tableau (23a)) so that [tobeba] and [tobʲa:] are selected as optimal in formal speech and in casual speech, respectively. Thus, the only place where *VbV(Closed) can be ranked is in the same stratum as MAX$_{\text{INIT}}$-C-IO. The following tableau confirms that this is the case:

(24) Tableau for /tob+eba/ ‘if fly/jump’ in casual speech

| Input: /tob+eba/ | No-Parse-μ (DelSeg) | Id-Ons (place) | Max $_{\text{Init}}$-C | *VbV (Cld) | Ons | *Lab | Parse -μ | Wt-Ident |
|---|---|---|---|---|---|---|---|---|
| a. ☞ tobʲa: | | | * | | | * | | * |
| b. toba | | | * | | | * | *! | |
| c. tobeba | | | | * | | **! | | |
| d. tobea | | | * | | *! | * | | |
| e. tobeda | | *! | | | | * | | |
| f. toba: | *! | | * | | | * | | * |

Here is another case in which *VbV(Closed) plays a crucial role. In Chapter 4, fn.44 we briefly discussed non-occurrence of *[keba] for /keɾeba/ ‘if’ in spite of the fact that the constraint ranking that opts for [kedomo] for /keɾedomo/ ‘although’ (i.e. *Lab and Max$_{\text{Fin}}$-C-IO ranked in the same stratum) selects *[keba] as optimal for /keɾeba/ ‘if’.

(25) Tableaux with *Lab and Max$_{\text{Fin}}$-C-IO being ranked in the same stratum

a. /keɾedomo/ ‘although’

| Input: /keɾedomo/ | *Lab | Max$_{\text{Fin}}$-C-IO | *ɾ | Max-C-IO | *Struc | Max-V-IO |
|---|---|---|---|---|---|---|
| a. kedo | | * | | **! | ** | ** |
| b. keɾedo | | * | *! | * | *** | * |
| c. ☞ kedomo | * | | | * | *** | * |
| d. keɾedomo | * | | *! | | **** | |

b. /keɾeba/ ‘if’[37]

| Input: /keɾeba/ | *Lab | Max$_{\text{Fin}}$-C-IO | *ɾ | Max-C-IO | *Struc | Max-V-IO |
|---|---|---|---|---|---|---|
| a. kʲa | | * | | **! | * | * |
| b. ka | | * | | **! | * | ** |
| c. keja | | * | | **! | ** | |
| d. keɾa | | * | *! | * | ** | * |
| e. ☹ keba | * | | | * | ** | * |

[37] Candidates with CL are omitted in this tableau.

However, those who use [kedomo] never utter *[keba] so we need a constraint that eliminates *[keba] before MAX-C-IO rules out the actual output [kʲa], and this is where *VbV(Closed) comes into play. Let us add this constraint to (25b) and redraw the tableau.

(26) Tableau for /keɾeba/ 'if' with *LAB and $\text{MAX}_{\text{FIN}}$-C-IO being ranked in the same stratum (revised)

| Input: /keɾeba/ | *VbV (Closed) | *LAB | $\text{MAX}_{\text{FIN}}$ -C-IO | *ɾ | MAX-C-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|---|
| a. ☞ kʲa | | | * | | ** | * | * |
| b. ka | | | * | | ** | * | **! |
| c. keja | | | * | | ** | **! | |
| d. keɾa | | | * | *! | * | ** | * |
| e. keba | *! | * | | | * | ** | * |

The fact that *[keba] is never optimal for /keɾeba/ 'if' no matter how the rest of the constraints are ranked provides strong support for the need for high-ranking *VbV(Closed).

Let us now include the constraints relevant to CL in the constraint ranking we have just established to see which candidate is selected as optimal for /eba/ 'if'.

(27) Tableau for /eba/ 'if' in casual speech

| Input: /eba/ | NO-PARSE-μ (DelSeg) | ID-ONS (place) | $\text{MAX}_{\text{INIT}}$-C | *VbV (Cld) | ONS | *LAB | PARSE -μ | WT-IDENT |
|---|---|---|---|---|---|---|---|---|
| a. ☞ ʲa: | | | * | | | | | * |
| b. ʲa | | | * | | | | *! | |
| c. a | | | * | | | | *! | |
| d. eba | | | | * | | *! | | |
| e. ea | | | * | | *! | | | |
| f. eda | | *! | | | | | | |
| g. a:[38] | *! | | * | | | | | * |

Although [ʲa:] (27a) and [eba] (27d) are even in the third stratum, *LAB in the fifth stratum opts for [ʲa:],[39] which is eventually selected as optimal for /eba/ 'if' in casual speech. The

[38] If we consider that /e/ and /a/ coalesce and surface as [a:], (27g) will not violate NO-PARSE-μ(DelSeg) or WT-IDENT-IO but will fatally violate high-ranking IDENT-IO(back) as well as UNIFORMITY-IO.

following tableaux show how [ɾʲa:] and [kʲa:] can also become optimal for /ɾeba/ and /keɾeba/, respectively:[40]

(28) Tableau for /ɾeba/ 'if' in casual speech

| Input: /ɾeba/ | NO-P-μ (DelSeg) | ID-ONS (place) | MAX $_{\text{INIT}}$-C | *VbV (Cld) | ONS | *LAB | MAX $_{\text{FIN}}$-C | *ɾ | P -μ | WT -ID |
|---|---|---|---|---|---|---|---|---|---|---|
| a. ☞ ɾʲa: | | | | | | | * | * | | * |
| b. ɾʲa | | | | | | | * | * | *! | |
| c. ɾa | | | | | | | * | * | *! | |
| d. ɾea | | | | | *! | | * | * | | |
| e. ɾeba | | | | *! | | * | | * | | |
| f. ʲa:[41] | | | *! | | | | * | | | * |
| g. ɾeda | | *! | | | | | | * | | |
| h. a: | *! | | * | | | | * | | | * |

(29) Tableau for /keɾeba/ 'if' in casual speech

| Input: /keɾeba/ | NO-P-μ (DelSeg) | ID-ONS (place) | *VbV (Cld) | ONS | *LAB | MAX $_{\text{FIN}}$-C | *ɾ | PARSE -μ | WT -ID |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ kʲa: | | | | | | * | | * | * |
| b. kʲa | | | | | | * | | **! | |
| c. ka | | | | | | * | | **! | |
| d. keɾa | | | | | | * | *! | * | |
| e. kea | | | | *! | | * | | * | |
| f. keba | | | *! | | * | | | * | |
| g. keɾeba | | | *! | | * | | * | | |
| h. keɾeda | | *! | | | | | * | | |
| i. ka: | *! | | | | | * | | * | * |

In (29), the optimal candidate still violates PARSE-μ because the mora projected by the deleted vowel cannot be parsed due to undominated NO-PARSE-μ(DelSeg). However, if

[39] Both MAX$_{\text{FIN}}$-C-IO and MAX-C-IO are ranked lower than *LAB so keeping /b/ is more costly than deleting it in the case of /eba/ 'if' and other closed-class items.

[40] In formal speech /ɾeba/ and /keɾeba/ surface as [ɾeba] and [keɾeba], respectively, but because the labial is not protected by MAX$_{\text{INIT}}$-C-IO in these morphemes, our current constraint ranking for formal speech will opt for *[ɾʲa] and *[keɾʲa]. There are two ways to prevent this; (i) assume that **CONTIG-IO(Closed)** dominates *VbV(Closed) only in formal speech; (ii) assume that *VbV(Closed) is low-ranking in formal speech.

[41] This candidate also violates NO-CASUAL-MERGER (cf. /eba/ → [ʲa:] 'if').

we suppose that the first /e/ surfaces as the glide, the second /e/ and /a/ coalesce and they surface as [$^j$a::], *[k$^j$a::] will fare better than [k$^j$a:], as seen in the following tableau:

(30) Tableau for /keɾeba/ 'if' in casual speech (revised)

| Input: /ke$_1$ɾe$_2$ba$_3$/ | NO-PARSE-μ (DelSeg) | PARSE -μ | UNIFORMITY -IO | WT-IDENT-IO | *STRUC | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☹ k$^j$$_1$a$_{23}$:: | | | * | * | * | |
| b. k$^j$$_2$a$_3$: | | *! | | * | * | * |
| c. k$^j$$_2$a$_3$:: | *! | | | ** | * | * |

How, then, can we reject the candidate (30a) that does not violate PARSE-μ? In Japanese, there is a constraint that militates against three or more mora syllables called ***3μ** (Kager 1999).[42] Unless the underlying representation has a long vowel (or a sequence of two identical vowels) followed by a cluster of consonants (or a moraic nasal in the case of Mimetic and Foreign vocabulary), *3μ is never violated.

(31) Violation of *3μ

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | tooɾ+te | to:tte | 'passing' |
| b. | kooɾ+ta | ko:tta | 'froze' |
| c. | ga:N | ga:N | 'clang' (mimetic) |
| d. | to:N | to:N | 'tone' (foreign) |

The domination of PARSE-μ by *3μ, therefore, ensures that such a candidate as *[k$^j$a::] is never selected as optimal.

In the last three sections we have seen that, in Japanese, CL does not take place to compensate for the loss of mora count due to deletion of segments and that it is only prompted by glide formation or vowel coalescence. In the next section, we will examine another kind of CL observed in Japanese – 'inverse CL' (Hayes 1989).[43]

[42] This constraint is also known as *μμμ (Prince & Smolensky 1993) and *TRIMORAICSYLL (Miglio & Morén forthcoming). See Perlmutter (1995) for discussion on *3μ in Japanese. Also see Chapter 8, 8.4.5 for further discussion on *3μ.

[43] Miyara (1980), Fukui (1986) and Poser (1986, 1988) do not discuss inverse CL in their respective articles.

## 6.6 INVERSE CL

Inverse CL is a process in which a consonant is lengthened to compensate for the loss of mora count caused by the deletion or the shortening of the preceding vowel.[44] In casual Japanese speech, inverse CL is observed in two adjective roots (32a-b), and it can also take place when a long vowel in a closed-class item is followed by a particle with an initial voiceless stop (32c-d).

(32) Inverse CL in casual Japanese speech[45, 46]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | tiisa+i | tʃi:sai | tʃissai / tʃittʃai[47] | 'small' |
| b. | ooki+i | o:ki: | okki: | 'big' |
| c. | so+o#ka | so:ka | sokka | 'I see' |
| d. | tabe+joo#to | tabejo:to | tabejotto | '(I think I) will eat' |

/tiisa+i/ 'small' and /ooki+i/ 'big' are undoubtedly two of the most common adjectives (according to the National Institute of Japanese Language (1962), they are the 98th and the 330th most frequently used word, respectively, of all Japanese vocabulary) and, in regard to the use of inverse CL in these words, the following results were obtained from the survey I conducted between November 2002 and January 2003:[48]

(33) Inverse CL in /tiisa+i/ 'small' and /ooki+i/ 'big'

Question: Do you use the following expressions? (No. of valid answers: 31)

| | Often | | Sometimes | | Maybe | | Probably not | | Never | |
|---|---|---|---|---|---|---|---|---|---|---|
| [tʃissai] | 13 | (42%) | 9 | (29%) | 6 | (19%) | 1 | (3%) | 2 | (6%) |
| [tʃittʃai] | 21 | (67%) | 6 | (19%) | 2 | (6%) | 0 | (0%) | 2 | (6%) |
| [okki:] | 25 | (81%) | 4 | (13%) | 0 | (0%) | 1 | (3%) | 1 | (3%) |

[44] Inverse CL is observed in LuGanda (e.g. /a:ta/ → [atta] 'he kills') (Clements 1986:58), and Sanskrit and Pāli show the alternation of [long vowel + singleton] and [short vowel + geminate] between them (e.g. [ni:da] ~ [nidda] 'abode, nest') (Hock 1986:441).

[45] As mentioned earlier, a sequence of two identical vowels surfaces as a long vowel in Japanese.

[46] In inverse CL, CL is optional but preferred with the exception of (32a-b), in which CL is obligatory.

[47] [tʃittʃai] sounds to me a little less mature than [tʃissai]. See Hamano (1986) for the symbolic use of palatalisation in Japanese.

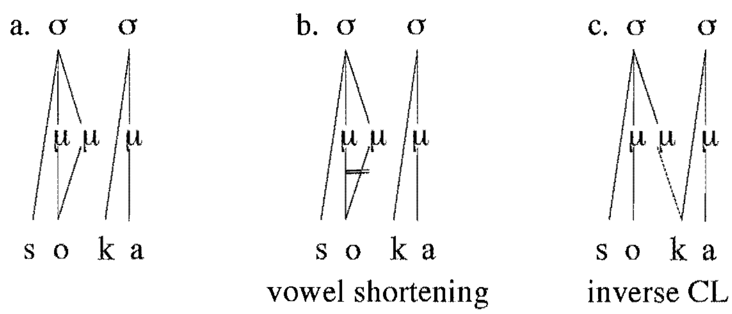
[48] The total number of subjects is 32 (18 males and 14 females; under 20: 6 M's, 6 F's, 20-34: 2 F's, 35-49: 11 M's, 4 F's, 50-64: 1 F, over 64: 1 M, 1F), and the survey was conducted in the form of a questionnaire using multiple-choice questions. See Chapter 8, 8.2 for further information on this survey.

Insofar as /tiisa+i/ 'small' and /ooki+i/ 'big' are concerned, the forms with inverse CL are used by both males and females across all ages and they tend to be used when the speakers want to express 'friendliness' and/or to emphasise the degree of 'smallness' or 'bigness'.

The second type of inverse CL, as seen in (32c-d), on the other hand, is less frequently observed than those we have just discussed above, and there seems to be a tendency for older speakers to use it less than younger speakers and among the latter for males to use it less than females. It is very likely that this is because those who use inverse CL do so in order to express 'friendliness', 'childishness' and/or 'cuteness',[49] in the same way that those who use vulgarisms do so to express 'roughness'.

In a moraic theory inverse CL can be accounted for as follows:

(34) Inverse CL in moraic theory




In OT, the lengthening of the consonant that follows the shortened vowel is due to PARSE-μ but the question is: why is the vowel shortened in the first place? My assumption is that, by deliberately making the surface form 'anti-faithful' to its underlying representation,[50] the speaker adds to the word or phrase a nuance that is not lexically stored – in the case of inverse CL, 'friendliness', 'childishness' and/or 'cuteness'.

In order to account for the process of inverse CL, I propose the following anti-faithfulness constraint, in the fashion of Horwood (2000) and Alderete (2001):

(35) Constraint 44

**¬WT-IDENT-IO**: It is not the case that corresponding segments agree in weight.[51]

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[49] It seems to me that one gradually stops using the second type of inverse CL as he/she grows older. This is probably because one wishes to make himself/herself sound less immature.
[50] For 'anti-faithfulness', see Horwood (2000) and Alderete (2001).
[51] '¬' indicates 'anti-faithfulness'.

Both in formal and casual speech, ¬WT-IDENT-IO is a low-ranking constraint so that lengthening or shortening of segments does not take place randomly. Only when the speaker wants to imply 'friendliness', 'childishness' and/or 'cuteness', however, this constraint is promoted above WT-IDENT-IO to prompt unfaithful realisation. Here are tableaux for /so+o#ka/ 'I see' before and after reranking.

(36) Tableaux for /so+o#ka/ 'I see' in casual speech

a. Before reranking: WT-IDENT-IO >> ¬WT-IDENT-IO

| Input: /$so_1$+$o_2$#ka/ | NO-PARSE-μ (DelSeg) | PARSE -μ | UNIFORMITY -IO | WT-IDENT-IO | ¬WT-IDENT-IO |
|---|---|---|---|---|---|
| a. ☞ $so_{12}$:ka | | | * | | * |
| b. $so_{12}$kka | | | * | *!* | |
| c. $so_{12}$ka | | *! | * | * | |
| d. $so_1$kka | *! | | | * | |
| e. $so_2$kka | *! | | | * | |

b. After reranking: ¬WT-IDENT-IO >> WT-IDENT-IO[52]

| Input: /$so_1$+$o_2$#ka/ | NO-PARSE-μ (DelSeg) | PARSE -μ | ¬WT-IDENT-IO | UNIFORMITY -IO | WT-IDENT-IO |
|---|---|---|---|---|---|
| a. $so_{12}$:ka | | | *! | * | |
| b. ☞ $so_{12}$kka | | | | * | ** |
| c. $so_{12}$ka | | *! | | * | * |
| d. $so_1$kka | *! | | | | * |
| e. $so_2$kka | *! | | | | * |

In the above tableaux, [so:ka] does not violate WT-IDENT-IO, thus a violation of ¬WT-IDENT-IO is incurred. With ¬WT-IDENT-IO outranking WT-IDENT-IO, at least one output segment needs to be unfaithful to its input correspondent in terms of mora count, and when unfaithful realisation involves deliberate shortening of a segment,[53] another segment must

[52] *[ssoka] and *[soka:] satisfy both PARSE-μ and ¬WT-IDENT-IO but the reason why they cannot be optimal is that they violate high-ranking *COMPLEX and undominated NOGAP, respectively.

[53] In order to satisfy both PARSE-μ and ¬WT-IDENT-IO, deliberate lengthening of a segment is also a possible option (e.g. [so:ka:], but not *[so:kka] due to *3μ, for /so+o#ka/ 'I see'). In fact, if we add [so:ka:] to Tableau (36b), this candidate will be selected as optimal. Vowel lengthening at the end of an utterance is common in Japanese to indicate the speaker's doubt (with a rising intonation) or understanding (with a falling intonation), thus [so:ka:] can be heard in speech. However, in order to prevent random lengthening of

be lengthened in order to satisfy PARSE-μ. Therefore, inverse CL can only take place when there is a long vowel (or a sequence of two identical vowels) underlyingly.[54]

At the beginning of this section I mentioned that inverse CL can take place when a long vowel in a closed-class item is followed by a particle with an initial voiceless stop. If we only have PARSE-μ, ¬WT-IDENT-IO >> WT-IDENT-IO, then inverse CL should take place even in open class when the condition (i.e. V:C[-voice, +obs]) is met, but that is not the case (e.g. /ookami/ → [o:kami]/*[okkami] 'wolf'), with the exception of /tiisa+i/ 'small' and /ooki+i/ 'big'. Therefore, we need a constraint that prevents open-class items from undergoing inverse CL. I thus propose the following constraint:

(37) Constraint 45

**WT-IDENT-IO(Open)**: No lengthening/shortening of segments in open-class items.

WT-IDENT-IO(Open) is rather freely violated in adjectives and adverbs when they are uttered in an emphatic manner but, otherwise, it is never violated. I thus rank this constraint in the third highest stratum together with other 'open-class' faithfulness constraints (i.e. ALIGN-L(Open), ANCHOR-IO(Open) and MAX-IO(Open)). The following tableau shows how WT-IDENT-IO(Open) militates against inverse CL in open-class items:

(38) Tableau for /ookami/ 'wolf' in casual speech[55]

| Input: /$o_1o_2$kami/ | WT-IDENT-IO(Open) | PARSE-μ | ¬WT-IDENT-IO | WT-IDENT-IO |
|---|---|---|---|---|
| a. ☞ $o_{12}$:kami | | | * | |
| b. $o_{12}$kkami | *!* | | | ** |
| c. $o_{12}$kami | *! | * | | * |
| d. $o_{12}$:kkami[56] | *! | | | * |

segments, we will probably need such a constraint as **DEP-μ-IO,** which should be ranked higher than ¬WT-IDENT-IO.

[54] The only closed-class items I can think of that have a sequence of two identical vowels are demonstrative adverbs /ko+o/ 'this way', /so+o/ 'that way, that's right' and /a+a/ 'that way', the volitional morphemes /joo/ (for vowel-final root verbs) and /oo/ (for consonant-final root verbs), and assumptive morphemes /daɾoo/ and /deʃoo/ 'probably'. Therefore, inverse CL among closed-class items is basically limited to these items (the last two morphemes are resistant to CL although the final /o/ can drop).

[55] Any candidate with only one /o/ (e.g. [$o_1$kami]) will be eliminated by MAX-IO(Open).

[56] This candidate can be eliminated by *3μ as well.

One last question is: if WT-IDENT-IO(Open) is so high-ranking, how can inverse CL ever take place in /tiisa+i/ 'small' and /ooki+i/ 'big'? I will address this question in Chapter 8, in which emphatic expressions will be discussed in detail.

We have accounted for 4 out of 6 cases in which CL appears to take place. (The fifth case is /iw+ɯ/ → [jɯ:] 'say', which will be discussed in 6.8 and the sixth case – vulgarisms – will be thoroughly examined in Chapter 7.) In the cases of inverse CL, CL is opted for, but in the other cases it is optional. We will discuss alternation between forms with and without CL in the next section.

## 6.7 WITH OR WITHOUT CL

As briefly mentioned in 6.4 and 6.5, CL is optional when contraction takes place in (i) a closed-class item followed by the topic/contrast marker and (ii) the conditional morphemes /eba/, /ɾeba/ and /keɾeba/.[57] We have seen in the previous sections that PARSE-μ dominates WT-IDENT-IO when CL occurs. Does this mean that the ranking of these two constraints is simply reversed when it does not take place? Let us see if that is so. Here are tableaux for /ko+ɾe#(w)a/ 'this (Topic)' and /eba/ 'if'.

(39) Tableau for /ko+ɾe#(w)a/ 'this (TOPIC)' without CL in casual speech (cf. (13))[58]

| Input: /ko+ɾe#(w)a/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | WT-IDENT-IO | PARSE -μ | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. koɾʲa: | | | | *! | | |
| b. ☞ koɾʲa | | | | | * | |
| c. koɾa | | | | | * | *! |
| d. koɾewa | | | *! | | | |
| e. koɾea | | *! | | | | |
| f. koɾa: | *! | | | * | | * |

[57] The only exception is when a closed-class item with final /a/ is followed by the topic/contrast marker (e.g. /anata#(w)a/ → [anata:] 'you (TOPIC)') (see Tableau (17)).

[58] If we consider /e/ and /a/ in /ko+ɾe#(w)a/ coalesce and surface as [a] in (39c) or [a:] in (39f), (39c) and (39f) will not violate NO-PARSE-μ(DelSeg) or MAX-V-IO but instead they will violate high-ranking IDENT-IO (back) as well as UNIFORMITY-IO. Therefore, any candidate with vowel coalescence has no chance of beating candidates with glide formation. The same applies to (40c) and (40g).

(40) Tableaux for /eba/ 'if' without CL in casual speech (cf. (27))

| Input: /eba/ | NO-P-μ (DelSeg) | ID-ONS (place) | MAX $_{\text{INIT}}$-C | *VbV (Cld) | ONS | *LAB | WT -ID | PARSE -μ | MAX -V |
|---|---|---|---|---|---|---|---|---|---|
| a. $^{j}$a: | | | * | | | | *! | | |
| b. ☞ $^{j}$a | | | * | | | | | * | |
| c. a | | | * | | | | | * | *! |
| d. eba | | | | * | | *! | | | |
| e. ea | | | * | | *! | | | | |
| f. eda | | *! | | | | | | | |
| g. a: | *! | | * | | | | * | | * |

As the above tableaux clearly show, the domination of PARSE-μ by WT-IDENT-IO can prevent CL from taking place.

Let us now move to inverse CL. As far as /tiisa+i/ 'small' and /ooki+i/ 'big' are concerned, CL is obligatory, but not necessarily so when a long vowel in a closed-class item is followed by a particle with an initial voiceless stop (e.g. /ik+oo#ka/ → [ikokka]/[ikoka] 'shall we go?'). Here are revised tableaux of (36a-b) with WT-IDENT-IO >> PARSE-μ (candidates that violate NO-PARSE-μ(DelSeg) are omitted).

(41) Tableaux for /so+o#ka/ 'I see' in casual speech (revised)

a. Before reranking: WT-IDENT-IO >> ¬WT-IDENT-IO

| Input: /so$_1$+o$_2$#ka/ | WT-IDENT-IO | PARSE -μ | UNIFORMITY -IO | ¬WT-IDENT-IO |
|---|---|---|---|---|
| a. ☞ so$_{12}$:ka | | | * | * |
| b. so$_{12}$kka | *!* | | * | |
| c. so$_{12}$ka | *! | * | * | |

b. After reranking: ¬WT-IDENT-IO >> WT-IDENT-IO

| Input: /so$_1$+o$_2$#ka/ | ¬WT-IDENT-IO | WT-IDENT-IO | PARSE -μ | UNIFORMITY -IO |
|---|---|---|---|---|
| a. so$_{12}$:ka | *! | | | * |
| b. so$_{12}$kka | | **! | | * |
| c. ☞ so$_{12}$ka | | * | *! | * |

In casual speech [soka] (41b.c) is acceptable and it can actually be heard especially when /so+o#ka/ is repeated (i.e. [sokasoka] 'I see, I see') but, as the use of [soka] by itself is uncommon, we still want [sokka] to be also selected as optimal. Hammond (2000:1-2) argues that, although many presentations of OT imply or even state that there is one and only one optimal candidate, a tableau can have several winning candidates. How, then, can we achieve this?

At the beginning of 6.4 I mentioned that the choice between a form with CL and a form without CL seems to be completely up to the speaker and that he/she may opt for one on one occasion and the other on another occasion even when talking to the same person. Therefore, in order to allow both forms to surface as optimal (e.g. [soka] and [sokka] 'I see', [koɾʲa] and [koɾʲa:] 'this (Topic)', [tobʲa] and [tobʲa:] 'if fly/jump'), we need the kind of grammar that Anttila (1997, 2002) and Anttila & Cho (1998) propose, that is, 'partially ordered grammar'. In partially ordered grammar some constraints are not ranked in strict domination order, thus the grammar allows variation in a single register of speech without any constraint reranking . In our case at hand, if we consider that PARSE-μ and WT-IDENT-IO are ranked in this way, theoretically we can obtain both a form with CL and a form without CL from one constraint ranking. Here are further revised tableaux of (39), (40) and (41b) with PARSE-μ and WT-IDENT-IO being ranked in the same stratum.

(42) Tableau for /ko+ɾe#(w)a/ 'this (TOPIC)' in casual speech (revised)

| Input: /ko+ɾe#(w)a/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | PARSE -μ | WT-IDENT-IO | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ koɾʲa: | | | | | * | |
| b. ☞ koɾʲa | | | | * | | |
| c. koɾa | | | | * | | *! |
| d. koɾewa | | | *! | | | |
| e. koɾea | | *! | | | | |
| f. koɾa: | *! | | | | * | * |

(43) Tableau for /eba/ 'if' in casual speech (revised)

| Input: /eba/ | NO-P-μ (DelSeg) | ID-ONS (place) | MAX $_{INIT}$-C | *VbV (Cld) | ONS | *LAB | PARSE -μ | WT -ID | MAX -V |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ ʲa: | | | * | | | | | * | |
| b. ☞ ʲa | | | * | | | | * | | |
| c. a | | | * | | | | * | | *! |
| d. eba | | | | * | | *! | | | |
| e. ea | | | * | | *! | | | | |
| f. eda | | *! | | | | | | | |
| g. a: | *! | | * | | | | | * | * |

(44) Tableau for /so+o#ka/ 'I see' in casual speech (further revised)

| Input: /so$_1$+o$_2$#ka/ | ¬WT-IDENT-IO | PARSE-μ | UNIFORMITY-IO | WT-IDENT-IO |
|---|---|---|---|---|
| a. so$_{12}$:ka | * | | * | |
| b. ☞ so$_{12}$kka | | | * | ** |
| c. ☞ so$_{12}$ka | | * | * | * |

In each of the above tableaux, the winning candidates are only distinguished by mora count and, apart from PARSE-μ and WT-IDENT-IO, no constraint distinguishes each set of winning candidates. Therefore, if we assume that these two constraints are ranked in the same stratum rather than one strictly dominating the other, we should be able to have two optimal candidates, one with CL and the other without CL, for one underlying representation, and this can explain why a speaker chooses to use one on some occasions and the other on other occasions for no particular reason.[59]

One last thing we need to check is what happens to closed-class items with a final back vowel followed by /(w)a/ when PARSE-μ and WT-IDENT-IO are ranked in the same stratum. Here is a further revised tableau of (19) for /bokɯ#(w)a/ 'I (Topic)'.

[59] If we follow Anttila's (1997) argument, a form with CL and a form without CL should have an equal chance of being selected, that is, 50% each, in utterances, but at this stage I do not have sufficient data to either confirm it or reject it. I will leave this matter to future investigation.

(45) Tableau for /bokɯ#(w)a/ 'I (Topic)' in casual speech (further revised)

| Input: /bokɯ$_1$#(w)a$_2$/ | NO-P-μ (DelSeg) | CODA COND | ONSET | *LAB | PARSE -μ | UNIF | WT-IDENT | MAX -V |
|---|---|---|---|---|---|---|---|---|
| a. ☞ boka$_{12}$: | | | | | | * | | |
| b. boka$_{12}$ | | | | | * | | *! | |
| c. boka$_2$: | * | | | | | | * | * |
| d. boka$_2$ | | | | | * | | | *! |
| e. bokɯwa | | | | *! | | | | |
| f. bokɯa | | | *! | | | | | |
| g. bokwa | | *! | | * | | | | * |

In the above tableau [boka$_{13}$:] (45a) is still selected as the sole optimal candidate for /bokɯ#(w)a/. As mentioned in fn.25, the use of a form without CL, such as (45b) or (45d), is not common when a closed-class item with a final non-low back vowel is followed by /(w)a/, and this is because a form like (45b) or (45d) has no chance of being selected as optimal no matter how we rank PARSE-μ and WT-IDENT-IO in relation to each other.[60] Why, then, is a form without CL not completely non-existent? Unfortunately, I do not have an answer to this question at this stage and, thus, further research is required in this respect.[61]

When glide formation takes place (e.g. /ko+ɾe#(w)a/ → [koɾʲa:]/[koɾʲa] 'this (TOPIC)'), CL is completely optional because PARSE-μ and WT-IDENT-IO always conflict and cannot be satisfied at the same time. When two back vowels coalesce (e.g. /bokɯ#(w)a/ → [boka:] 'I (TOPIC)'), on the other hand, CL is preferred and in some cases it is

[60] In fn.25 I mentioned that /anata#wa/ 'you (TOPIC)' never surfaces as *[anata], and Tableau (17) clearly opted for the candidate with CL. However, if PARSE-μ, WT-IDENT-IO and UNIFORMITY-IO are ranked in the same stratum, [anata$_{12}$:], [anata$_1$] and [anata$_2$] will all look optimal in Tableau (17), but if we add MAX-V-IO to the tableau, we can still select [anata$_{12}$:] as the only winner.

| Input: /anata$_1$#(w)a$_2$/ | PARSE-μ | UNIFORMITY-IO | WT-IDENT-IO | MAX-V-IO |
|---|---|---|---|---|
| a. ☞ anata$_{12}$: | | * | | |
| b. anata$_{12}$ | * | * | *! | |
| c. anata$_1$ | * | | | *! |
| d. anata$_2$ | * | | | *! |

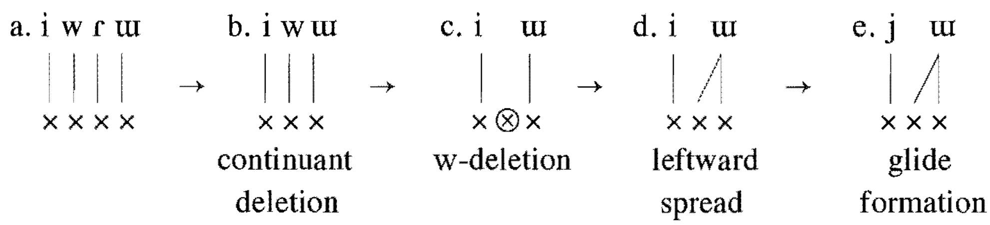
[61] /bokɯ#(w)a/ → [boka] 'I (TOPIC)' cannot be considered in the light of anti-faithfulness. Unlike those words and phrases with inverse CL, [boka] does not imply 'friendliness' or 'childishness' any more than [boka:]. (/bokɯ/ is used only by males so that 'cuteness' does not apply.)

obligatory because the coalesced vowel must have two moras in order to satisfy both PARSE-μ and WT-IDENT-IO. In this section, by placing PARSE-μ and WT-IDENT-IO in the same stratum, we managed to capture the difference between CL with glide formation and CL with vowel coalescence in OT.

## 6.8 [jɯː] 'say'

The process of /iw+ɯ/ → [jɯː] from the point of view of CL has been discussed in depth by Fukui (1986) and Poser (1986, 1988).[62] Fukui argues that w-deletion leaves an empty slot which is filled in by the vowel that follows.

(46) Fukui's analysis (based on his argument)



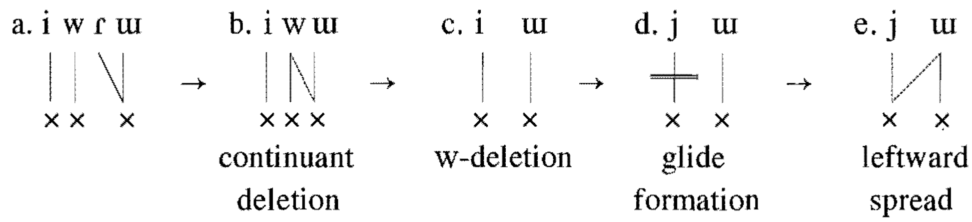

He argues that continuant deletion deletes everything including the slot but that w-deletion leaves an empty slot which requires re-linking. His argument for the preservation of the slot after w-deletion is based on such a gemination process as /iw+ta/ → [itta] 'said', in which he considers that the slot left empty due to w-deletion is linked to /t/.[63] Granting that /iw+ta/ → [itta] involves w-deletion and CL, the empty slot is linked to a coda, which is a mora bearer, while in (46c) the empty slot is linked to an onset, which is not a mora bearer. Thus, we cannot discuss these two processes on the same level. The problem with his

[62] They both argue that the non-past tense morpheme is /ɾɯ/, whether it follows vowel-final root verbs or consonant-final root verbs, and that the continuant deletion rule deletes the flap when the morpheme is directly preceded by a consonant. However, following the more widely accepted view (Suzuki 1972:265-266, Shirota 1998:29, among others), I consider that the non-past tense morpheme for vowel-final root verbs is /ɾɯ/ and that for consonant-final root verbs is /ɯ/. Fukui (1986:360) also argues that the non-past affirmative form of /iw/ 'say' is [jɯː]. Although it is true that /iw+ɯ/ (or /iw+ɾɯ/, according to him) appears to be often pronounced as such, native speakers of Japanese can and sometimes do pronounce this word as [iɯ] in careful or slow speech. For this reason, I cannot agree to his argument that [iɯ] is ungrammatical.

[63] See 6.3 for the author's interpretation of this process.

analysis seems to lie in his uniform treatment of /w/ regardless of its syllabic role. Poser, on the other hand, is right in pointing out that it is glide formation, not w-deletion, that leaves an empty slot which needs to be linked to the final vowel.

(47) Poser's analysis (based on his argument)




If we consider that /iw+ɯ/ → [jɯː] is a process in which CL takes place to compensate for the loss of mora count caused by glide formation after labial deletion, it seems plausible and it makes sense in moraic phonology. However, I question the process of /iw+ɯ/ → [jɯ:] itself. As we saw in (1), glide formation accompanied by CL is observed in such phrases as follows:

(48) Glide formation followed by CL in casual speech

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | so+ɾe#de#(w)a | soɾedʒa: | 'then' |
| b. | jom+i#(w)a | jom$^j$a: | 'reading (TOPIC)' |
| c. | tob+eba | tob$^j$a: | 'if fly/jump' |
| d. | na+keɾeba | nak$^j$a: | 'if not ...' |

The difference between alleged /iw+ɯ/ → [jɯ:] and those in (48) is that CL is obligatory in the former while it is optional in the latter. If CL is not always obligatory after glide formation, why can we not have *[jɯ] as well as [jɯ:] for /iw+ɯ/? The constraint ranking we have established in 6.7 (i.e. PARSE-μ and WT-IDENT-IO ranked in the same stratum) should surely allow both *[jɯ] and [jɯ:] to surface as optimal. Another argument of mine comes from the fact that some speakers do utter [jɯwanai] 'not say', [jɯtta] 'said' and so forth. If we assume that their respective underlying representations are /iw+ana+i/ and /iw+ta/, how can we account for the sudden emergence of [ɯ] in these words?

According to the National Institute of Japanese Language (1962), /iw/ is the third most frequently used word of all Japanese vocabulary, so that we could conclude that all these antics of /iw/ are due to frequency effects. However, my conclusion is that the underlying representation for [jɯː] 'say' is not /iw+ɯ/ but /jɯw+ɯ/.[64] In Japanese, alternation between /i/ and /jɯ/ are well attested synchronically (mostly in regional dialects; e.g. /iwa/~/jɯwa/ 'rock', /jɯgam+ɯ/~/igam+ɯ/ 'be distorted', /o+tɯjɯ/~/o+tɯi/ '(thin) soup') and diachronically (e.g. /iwaɾe/~/jɯwaɾe/ 'reason, origin', /jɯk+ɯ#saki/~/ik+ɯ#saki/ 'destination', /kosobajɯ+i/~/kosobai+i/ 'ticklish') (Kishida 1998: 314-317). If we assume /jɯw+ɯ/ as the underlying representation for [jɯː] 'say', it can explain why we never have *[jɯ] (due to MAX-IO(Open) and M-PARSE(tense) neither vowel can be deleted) and why we have [jɯwanai] (from /jɯw+ana+i/) 'not say' and [jɯtta] (from /jɯw+ta/) 'said'. Therefore, I conclude that [jɯː] 'say' is not the output of /iw+ɯ/ and that what Fukui (1986) and Poser (1986, 1988) consider to be CL is, in fact, not CL.

## 6.9 SUMMARY

In this chapter we have discussed CL in Japanese. Unlike in other languages which exhibit CL, a loss of mora count is compensated for in Japanese only when the segment projecting the mora is still present in the surface form, thus CL co-occurs with glide formation (e.g. /ko+ɾe#(w)a/ → [koɾʲaː] 'this (TOPIC)'), vowel coalescence (e.g. /bokɯ$_1$#(w)a$_2$/ → [boka$_{12}$ː] 'I (TOPIC)') or vowel shortening (e.g. /so$_1$+o$_2$#ka/ → [so$_{12}$kka] 'I see'), but not with vowel deletion (e.g. /te#ik+ɯ/ → [tekɯ]/*[tekkɯ]/*[teːkɯ] '(do) gradually') or coda deletion.[65]

[64] A sequence of two identical vowels surfaces as a long vowel in Japanese (e.g. /ɯɯ/ → [ɯː]). See Chapter 7, 7.3 for further discussion on this.

[65] As mentioned in 6.3, I do not consider /iw+ta/ → [itta] 'said' to be coda deletion accompanied by CL, and I believe that there is no case of coda deletion in Japanese.

The contraction of closed-class items followed by the topic/contrast marker /(w)a/ was the first case of CL we discussed in this chapter. Miyara's (1980) vowel weakening rule looked promising and it did work for morphemes with a final front vowel. However, when a morpheme with a final back vowel precedes /(w)a/, his vowel weakening rule becomes opaque due to the w-deletion rule that follows, and it turned out that it is not compatible with OT. Our conclusion was, therefore, that a front vowel followed by /a/ is turned into a glide, as Miyara argues, while a back vowel followed by /a/ coalesces with the /a/ to surface as a long vowel.[66]

In the contraction of the conditional forms, the deletion of the leftmost consonant from /eba/ 'if' posed a problem; the domination of *LAB by $\text{MAX}_{\text{INIT}}$-C-IO means that /b/ cannot be deleted. In order to solve this problem, I proposed a class-specific markedness constraint *VbV(Closed), and successfully accounted for the contraction of /eba/ → [$^{j}$a:].

Our third case of CL was inverse CL, in which the shortening of a vowel and the lengthening of the following consonant takes place concomitantly. The user of inverse CL deliberately makes the surface form unfaithful to its underlying representation in order to have the word or phrase they utter carry a connotation of 'friendliness', 'childishness' and/or 'cuteness'. The constraint we needed to account for inverse CL was ¬WT-IDENT-IO, which requires that at least one input segment and its output correspondent not agree in weight. Inverse CL showed us that 'anti-faithfulness' (Horwood 2000, Alderete 2001) plays some role in Japanese phonology as well.

Following inverse CL, we discussed the alternation between forms with CL and without CL. CL is due to the interaction of two conflicting faithfulness constraints, PARSE-μ and WT-IDENT-IO, and when the former dominates the latter, CL takes place simultaneously with glide formation, vowel coalescence or vowel shortening. However, with the exception of vulgarisms as well as /tiisa+i/ → [tʃissai]/[tʃittʃai] 'small' and /ooki+ i/ → [okki:] 'big', CL is optional in Japanese and we needed a grammar that allows two candidates to be selected as optimal for one underlying representation. In order to

[66] Further to fn.29, in LuGanda, a high vowel followed by another vowel surfaces as a glide and a non-high vowel followed by another vowel is deleted, then the remaining vowel is lengthened to compensate for the loss of mora count (Katamba 1989:171-172) – similar processes to those of Japanese.

achieve this end, we adopted 'partially ordered grammar' (Anttila 1997, 2002, Anttila & Cho 1998) and by placing both PARSE-μ and WT-IDENT-IO in the same stratum we could have both forms with CL and forms without CL as surface forms.

In the last section, we examined the alleged case of CL: /iw+ɯ/ → [jɯː] 'say' (Fukui 1986, Poser 1986, 1988). It did appear to be a process of CL at first sight, but I rejected this claim by pointing out that (i) CL is optional when glide formation is involved in Yamato vocabulary, and (ii) [jɯwanai] 'not say', [jɯtta] 'said' and so on cannot be derived if we assume that the underlying root is /iw/ for these words. I thus concluded that this alleged case is in fact not a case of CL but that the underlying representation for [jɯː] is simply /jɯw+ɯ/.

As a conclusion, I sum up the constraints discussed in this chapter as follows:

(49) Constraint ranking 25[67]

CODACOND, **NO-PARSE-μ(DelSeg)**
>> IDENT-ONSET-IO(place)
>> MAX-IO(Open), $\text{MAX}_{\text{INIT}}$-C-IO, **WT-IDENT-IO(Open)**, ***VbV(Closed)**
>> IDENT-IO(anterior), ONSET
>> *LAB
>> MAX-IO(Root), $\text{MAX}_{\text{FIN}}$-C-IO
>> *ɾ
>> MAX-C-IO, **PARSE-μ**, UNIFORMITY-IO, **WT-IDENT-IO**
>> *STRUC
>> MAX-V-IO, **¬WT-IDENT-IO**

[67] I assume that ¬WT-IDENT-IO is ranked very low under ordinary circumstances and that it is only promoted above PARSE-μ and WT-IDENT-IO when the speaker wants to imply a connotation of 'friendliness', 'childishness' and/or 'cuteness' in his/her utterance. As mentioned in fn.27, we will revise the ranking of UNIFORMITY-IO in Chapter 7, 7.2.2, and will discuss the ranking of *3μ in Chapter 8. 8.4.5.

# CHAPTER SEVEN

## VOWEL COALESCENCE AND VULGARISMS

### 7.1 INTRODUCTION

In Japanese, vowel coalescence is observed when (i) a sequence of two identical vowels occurs within a morpheme or across a morpheme boundary and (ii) a sequence of a mid vowel and a high vowel occurs within a morpheme in Sino-Japanese vocabulary.[1]

(1) Vowel coalescence[2]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | ookami | o:kami | 'wolf' |
| b. | kawai+i | kawai: | 'cute' |
| c. | gakɯ+sei | gakɯse: | 'student' |
| d. | koɯ+koɯ | ko:ko: | 'high school' |

Even when a mid vowel is directly followed by a high vowel, however, vowel coalescence is blocked if (i) there is a morpheme boundary between the mid vowel and the high vowel[3] or (ii) the vowels do not share the same value for [back].

(2) No vowel coalescence – a morpheme boundary intervening between vowels

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | ne#iki | neiki | 'the breathing in sleep' |
| b. | te#iɾe | teiɾe | 'care, repair' |
| c. | ko#ɯma | koɯma | 'pony, colt' |
| d. | o+ɯti | oɯtʃi | '(your) house' |

[1] I believe that neither /ei/ nor /oɯ/ occurs within a single morpheme in Yamato vocabulary.

[2] The reason for postulating /ei/ and /oɯ/, instead of /e:/ and /o:/, in (1c-d) is that in very slow careful speech these vowel sequences can surface as [ei] and [oɯ]. If we postulate /e:/ and /o:/, we will also have difficulties in explaining why a pause can be inserted between the two moras when uttered very slowly and/or carefully.

[3] I cannot think of any word of Chinese origin containing /e+i/ or /o+ɯ/. Therefore, we could say that, when conditions are met, Sino-Japanese vocabulary always displays the vowel coalescence in question but Yamato vocabulary never does (see Ôtsubo (ed.) (1987:31) who also makes a similar statement). Vance (1987:14) states that in rapid speech /e+i/ and /o+ɯ/ frequently become [e:] and [o:], respectively, but I, as a native Japanese speaker, am inclined to support Maeda (1971:172) who claims that /ke#iɾo/ 'hair colour', for instance, is never pronounced as *[ke:ɾo] unless the speaker does not recognise the morpheme boundary.

(3) No vowel coalescence – vowels not sharing the same value for [back][4]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | koi | koi | 'carp' |
| b. | me#ɯe | meɯe | 'one's superiors/seniors' |

In order for vowel coalescence to take place, all the conditions mentioned above must be satisfied. Therefore, vowel coalescence is not observed when (i) a vowel sequence is not composed of a mid vowel and a high vowel in this order even if they share the same value for [back] or (ii) when a sequence consists of any other combination of vowels.[5]

(4) No vowel coalescence – high vowel directly followed by a mid vowel

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | osie+rɯ | oʃierɯ | 'teach' |
| b. | ɯrɯow+ɯ | ɯrɯoɯ | 'become moist' |

(5) No vowel coalescence – others[6]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | mi#ɯti | miɯtʃi | 'one's relatives' |
| b. | i+oN | ioN | 'allophone' |
| c. | ki+atɯ | kijatsɯ[7] | 'air pressure' |
| d | kɯi | kɯi | 'regret' |
| e. | tɯkɯe | tsɯkɯe | 'desk' |
| f. | hɯ+aN | ɸɯaN | 'anxiety' |
| g. | se#ow+ɯ | seoɯ | 'carry on the back' |
| h. | te#asi | teaʃi | 'arms and legs' |
| i | koe | koe | 'voice' |
| j. | jo#ake | joake | 'dawn' |

[4] I believe that there is no morpheme that contains /eɯ/ in Japanese.

[5] Kawahara (2001:38) claims that /i/ and /ɯ/ coalesce to [jɯː] (I believe that he has /iw+ɯ/ → [iɯ] → [jɯː] 'say' in mind, which we rejected in Chapter 6, 6.8), but the fact that /mi#ɯti/ 'one's relations' and /ki+ɯN/ 'opportunity', for instance, are never realised as *[mʲɯːtʃi] and *[kʲɯːN], respectively, even in sloppy pronunciation suggests that his claim is not sustainable. Poser (1986:180) provides cases with /iɯ/~[jɯː] but because this type of alternation is limited to Foreign vocabulary (e.g. /arɯminiɯmɯ/ → [arɯmiɲɯːmɯ] 'aluminium'), it cannot be considered to be a general rule.

[6] I believe that in Yamato and Sino-Japanese vocabulary there is no morpheme that contains a front vowel directly followed by a back vowel (i.e. /iɯ/, /io/, /ia/, /eɯ/, /eo/ or /ea/), a non-low vowel directly followed by a low vowel (i.e. /ia/, /ɯa/, /ea/ or /oa/), or /aɯ/.

[7] When /a/ follows /i/ across a morpheme boundary, a glide is normally inserted in speech, whether formal or casual. See Chapter 1, (11) and Chapter 3, fn.20.

| | | | |
|---|---|---|---|
| k. | aida | aida | 'interval' |
| l. | kaerɯ | kaerɯ | 'frog' |
| m. | a+ɯN | aɯN | 'expiration and inspiration' |
| n. | kao | kao | 'face' |

In casual speech, however, males sometimes pronounce /a/+/i/, /o/+/i/ and /ɯ/+/i/ as [e:], [e:] and [i:], respectively, in order to express 'roughness', which Kawakami (1977) describes as "vulgarisms" (English translation by Vance (1987)). Here are some examples, repeated from Chapter 6, (1.vi).

(6) Vulgarisms

| | Underlying | Surface (formal) | Surface (vulgar) | Gloss |
|---|---|---|---|---|
| a. | deka+i | dekai | deke: | 'huge' |
| b. | sɯgo+i | sɯŋoi | sɯŋe: | 'terrific, terrible' |
| c. | samɯ+i | samɯi | sami: | 'cold' |

In this chapter, we will first discuss how we should address underlying vowel sequences and their realisation in Japanese within the framework of OT and later attempt to account for vulgarisms by upgrading just one constraint.

## 7.2. PROHIBITION AGAINST VOWEL COALESCENCE

In this section we will account for /ei/ → [e:] and /oɯ/ → [o:] in normal (i.e. non-vulgar) speech by examining the cases where vowel coalescence does not take place.

### 7.2.1 Between Vowels Not Sharing the Same Value for [back]

As mentioned in the previous section, vowel coalescence only takes place between vowels that share the same value for [back], except in vulgarisms. This can be ascribed to the following constraint:

(7) Constraint 46

**IDENT-IO(back)**: No change in the values for [back] (Kager 1999).

Although IDENT-IO(back) is a high-ranking constraint in Japanese, it is always violated in vulgarisms, in which /a+i/ and /o+i/ surface as /e:/ and /ɯ+i/ as /i:/, so it cannot be undominated. Therefore, I place it in the third stratum where IDENT-IO(place) and MAX-IO (Open), among others, are ranked.[8] Let us see how IDENT-IO(back) blocks vowel coalescence in a tableau for /kɯi/ 'regret' (5d). (Constraints that none of the candidates violates and those that all the candidates violate equally are omitted, together with some low-ranking constraints, from the tableaux in this chapter.)

(8) Tableaux for /kɯi/ 'regret'[9]

| Input: /$kɯ_1i_2$/ | MAX-IO (Open) | IDENT-IO (back) | ONSET | PARSE-μ | UNIFORMITY -IO | WT-IDENT-IO |
|---|---|---|---|---|---|---|
| a. ☞ kɯi | | | * | | | |
| b. $kɯ_{12}$: | | *! | | | * | |
| c. $ki_{12}$: | | *! | | | * | |
| d. kɯɯ | | *! | * | | | |
| e. kii | | *! | * | | | |
| f. $kɯ_{12}$ | | *! | | * | * | * |
| g. $ki_{12}$ | | *! | | * | * | * |
| h. $kɯ_1$ | *! | | | * | | |
| i. $ki_2$ | *! | | | * | | |

As clearly seen in this tableau, any candidate with coalescence of two vowels that do not share the same value for [back] has no chance of winning due to a violation of high-ranking IDENT-IO(back). This applies to any combination of front and back vowels in whichever order.

### 7.2.2 Between Vowels Not Sharing the Same Height: Within a Morpheme

In an open-class item, when the members of a vowel sequence do not share the same height, they do not coalesce, except /ei/ and /oɯ/, due to the following constraint:[10]

[8] The reason for ranking IDENT-IO(back) in the third stratum, not in the second stratum, will become apparent in 7.4 when we discuss vulgarisms (also see fn.45).

[9] Hiatus within an open-class item is never resolved by means of consonant insertion (e.g. *[kɯʔi]) due to undominated CONTIG-IO(Open) (see Chapter 2, 2.3.4).

[10] The only closed-class item I can think of that contains a sequence of non-identical vowels is /gɯrai/ 'about, to ... extent'. This morpheme never undergoes vowel coalescence due to high-ranking IDENT-IO(back).

(9) Constraint 47

**Ident-IO(height)(Open)**: No change in the values for height in open-class items.[11]

NB: Ident-IO(height)(Open) should be considered as a gradient constraint, just like Kirchner's (1996) **Raising** (maximise vowel height). Thus, /aɯ/ → [ɯ:], for instance, violates Ident-IO(height)(Open) twice.

The fact that /ei/ and /oɯ/ surface as [e:] and [o:], respectively, suggests that this constraint is ranked no higher than Onset, while the fact that all the other vowel sequences do not normally undergo coalescence suggests that it cannot be ranked any lower than Onset, as the following combined comparative tableau shows:

(10) Combined comparative tableau for /gakɯ+sei/ 'student' (1c) and /kao/ 'face' (5n)

| Input: | | Onset | Ident-IO(height)(Open) |
|---|---|---|---|
| /gakɯ+sei/ | a. gakɯse: ~ gakɯsei | W | L |
| /kao/ | b. kao ~ ka: | L | W |
| | c. kao ~ ko: | L | W |

Therefore, the only place where Ident-IO(height)(Open) can be placed is in the same stratum as Onset. Let us draw tableaux for /gakɯ+sei/ 'student' and /kao/ 'face' to see how Ident-IO(height)(Open) affects the selection of optimal candidates.

(11) Tableaux for /gakɯ+sei/ 'student' and /kao/ 'face'[12]

| Input: /gakɯ+se$_1$i$_2$/ | Max (Open) | Ident-IO (height)(Open) | Ons | Parse -μ | Uniform -IO | Wt-Ident | *Struc |
|---|---|---|---|---|---|---|---|
| a. gakɯse$_{12}$: | | * | | | *! | | *** |
| b. gakɯʃi$_{12}$: | | * | | | *! | | *** |
| c. ☹ gakɯsei | | | * | | | | **** |
| d. gakɯse$_{12}$ | | * | | *! | * | * | *** |
| e. gakɯʃi$_{12}$ | | * | | *! | * | * | *** |
| f. gakɯse$_1$ | *! | | | * | | | *** |
| g. gakɯʃi$_2$ | *! | | | * | | | *** |

[11] We will discuss a constraint that militates against any change in the values for height in closed-class items, namely, **Ident-IO(height)(Closed)**, in 7.2.4.

[12] CVLinkage(I) and Ident-IO(anterior) are omitted because they are irrelevant when /ei/ follows a non-coronal obstruent.

| Input: /ka₁o₂/ | MAX-IO (Open) | IDENT-IO (height)(Open) | ONSET | PARSE -μ | UNIFORM | WT-IDENT | *STRUC |
|---|---|---|---|---|---|---|---|
| h. ☞ kao | | | * | | | | ** |
| i. $ka_{12}$: | | * | | | *! | | * |
| j. $ko_{12}$: | | * | | | *! | | * |
| k. $ka_{12}$ | | * | | *! | * | * | * |
| l. $ko_{12}$ | | * | | *! | * | * | * |
| m. $ka_1$ | *! | | | * | | | * |
| n. $ko_2$ | *! | | | * | | | * |

In the above tableaux, the optimal candidate for /kao/ 'face' is correctly selected but that for /gakɯ+sei/ 'student' is not due to the domination of *STRUC by UNIFORMITY-IO, which was provisionally established in Chapter 5, 5.5.1 because at that time there was no evidence to indicate that UNIFORMITY-IO should be demoted any further. If UNIFORMITY-IO can be demoted below *STRUC, then the actual output for /gakɯ+sei/ (i.e. [gakɯse:] (11a)) can at least beat the incorrectly selected candidate (i.e. *[gakɯsei] (11c)) although it will end up being a tie with *[gakɯʃi:] (11b). However, the demotion of UNIFORMITY-IO below *STRUC will cause havoc to the selection of the optimal candidate for /kao/ 'face', in which *[ka:] and *[ko:] will adversely surface as optimal if *STRUC dominates UNIFORMITY-IO. Therefore, UNIFORMITY-IO can neither outrank *STRUC nor be outranked by *STRUC. Let us now replace *STRUC with the *V subhierarchy (i.e. *i >> *ɯ >> *e >> *o >> *a; see Chapter 3, 3.3 for these constraints and their ranking) and assume that UNIFORMITY-IO can intervene between two members of the *V subhierarchy, namely, *ɯ and *e.[13] The following are revised tableaux for /gakɯ+sei/ 'student' and /kao/ 'face' in which UNIFORMITY-IO intervenes between the *V[+high] constraints (i.e. *i and *ɯ) and the *V [-high] constraints (i.e. *e, *o and *a):

[13] The demotion of UNIFORMITY-IO below *ɯ will not cause trouble to the tableaux in the previous chapters, in which the former plays some role in the selection of the optimal candidate. See Chapter 5 Tableau (48) and Chapter 6 Tableaux (17), (19) and (45), in which all the actual outputs violate UNIFORMITY-IO and are still selected as optimal.

(12) Tableaux for /gakɯ+sei/ 'student' and /kao/ 'face' (revised)

| Input: /gakɯ+se$_1$i$_2$/ | MAX (Open) | IDENT-IO (height)(Open) | ONS | PARSE -μ | WT-IDENT | *i | UNIF | *e |
|---|---|---|---|---|---|---|---|---|
| a. ☞ gakɯse$_{12}$: | | * | | | | | * | * |
| b. gakɯʃi$_{12}$: | | * | | | | *! | * | |
| c. gakɯsei | | | * | | | *! | | * |
| d. gakɯse$_{12}$ | | * | | *! | * | | * | * |
| e. gakɯʃi$_{12}$ | | * | | *! | * | * | * | |
| f. gakɯse$_1$ | *! | | | * | | | | * |
| g. gakɯʃi$_2$ | *! | | | * | | * | | |

| Input: /ka$_1$o$_2$/ | MAX-IO (Open) | IDENT-IO (height)(Open) | ONSET | PARSE -μ | WT-IDENT | UNIF | *o | *a |
|---|---|---|---|---|---|---|---|---|
| h. ☞ kao | | | * | | | | * | * |
| i. ka$_{12}$: | | * | | | | *! | | * |
| j. ko$_{12}$: | | * | | | | *! | * | |
| k. ka$_{12}$ | | * | | *! | * | * | | * |
| l. ko$_{12}$ | | * | | *! | * | * | * | |
| m. ka$_1$ | *! | | | * | | | | * |
| n. ko$_2$ | *! | | | * | | | * | |

This time the actual candidates for both /gakɯ+sei/ 'student' and /kao/ 'face' are correctly selected, and in the tableau for /gakɯ+sei/ 'student' we can eliminate the unwanted *[gakɯʃi:] at the same time as *[gakɯsei] by simply placing UNIFORMITY-IO between *i and *e. What the intervention of UNIFORMITY-IO between *V[+high] and *V[-high] ensures, therefore, are (i) vowel coalescence is allowed only when one of the members of a vowel sequence is [+high] and (ii) a coalesced vowel must be [-high]. Further to the members of a vowel sequence to which coalescence can occur, the other member must be a mid vowel; when a vowel sequence is composed of a low vowel and a high vowel (e.g. /aɯ/),[14] its coalescence incurs multiple violations of IDENT-IO(height)(Open) so that a candidate with vowel coalescence can never beat a candidate that preserves the sequence which only violates ONSET once, as seen in the following tableau for /aɯto/ 'out':

[14] As mentioned in fn.6, no morpheme contains /ɯa/ or /aɯ/ in Yamato and Sino-Japanese vocabulary, so these two vowel sequences can only occur in Foreign and Mimetic vocabulary.

(13) Tableaux for /auto/ 'out'

| Input: /auto/ | IDENT-IO (height)(Open) | ONSET | *ɯ | UNIFORMITY -IO | *o | *a |
|---|---|---|---|---|---|---|
| a. ☞ auto | | * | * | | * | * |
| b. a:to | **! | | | * | * | * |
| c. o:to | **! | | | * | ** | |
| d. ɯ:to | **! | | * | * | * | |

From the above discussion, we now know that our constraint ranking can allow only an underlying vowel sequence composed of a mid vowel and a high vowel to coalesce and surface as a long mid vowel. However, it fails to explain why /ie/ and /ɯo/ never surface as [e:] and [o:], respectively, as seen in the following tableaux for /osie+ɾɯ/ 'teach' (4a) and /ɯɾɯow+ɯ/ 'become moist' (4b).

(14) Tableaux for /osie+ɾɯ/ 'teach' and /ɯɾɯow+ɯ/ 'become moist'[15, 16]

| Input: /osie+ɾɯ/ | IDENT-IO (height)(Open) | ONSET | *i | UNIFORMITY -IO | *e |
|---|---|---|---|---|---|
| a. oʃieɾɯ | | * | *! | | * |
| b. ☹ ose:ɾɯ | * | | | * | * |
| c. oʃi:ɾɯ | * | | *! | * | |

| Input: /ɯɾɯow+ɯ/ | IDENT-IO (height)(Open) | ONSET | *ɯ | UNIFORMITY -IO | *o |
|---|---|---|---|---|---|
| d. ɯɾɯoɯ | | * | ***! | | * |
| e. ☹ ɯɾo:ɯ | * | | ** | * | * |
| f. ɯɾɯ:ɾɯ | * | | ***! | * | |

If we assume that [ie] and [ɯo] are diphthongs and do not violate ONSET, the actual outputs (14a) and (14d) will be selected as optimal. However, as mentioned in Chapter 2, fn.84, I consider Japanese to be a language that does not permit diphthongs for the reason that the second member of any vowel sequence can be separated from the first member by

[15] (14a) and (14c) also violate IDENT-IO(anterior), which is ranked in the same stratum as IDENT-IO(height) (Open) and ONSET, but, in order to show that it is *V[+high] that casts the deciding vote when IDENT-IO (anterior) is irrelevant, IDENT-IO(anterior) is omitted from the tableau.

[16] /ie/ and /ɯo/ cannot surface as /je/ and /wo/, respectively, in Japanese just to avoid an ONSET violation, due to undominated ***jV[-back]** and *wV[-low].

inserting a pause or a glottal stop, which is on a par with Kindaichi (1967:116).[17] I, therefore, officially bring in the following undominated constraint:

(15) Constraint 48

***DIPHTHONG**: Diphthongs are disallowed (Prince & Smolensky 1993).

This constraint prohibits any underlying vowel sequence, whether there is a morpheme boundary in it or not, from surfacing as a diphthong, and forces any vowel sequence at the surface level to violate ONSET.

(16) Tableau for /ei/

| Input: /ei/ | *DIPHTHONG | IDENT-IO (height)(Open) | ONSET | *i | UNIFORMITY -IO | *e |
|---|---|---|---|---|---|---|
| a. ☞ e: | | * | | | * | * |
| b. i: | | * | | *! | * | |
| c. ei | | | * | *! | | * |
| d. e̯i | *! | | | * | | * |

In Tableaux (14), due to undominated *DIPHTHONG, an ONSET violation by the actual outputs (14a) and (14d) is unavoidable so we need to eliminate the incorrectly selected candidates (14b) and (14e) before *V[+high] rules out (14a) and (14d). Earlier in this subsection we accounted for /ei/ → [e:] and /oɯ/ → [o:]. In both cases the height the coalesced vowel carries is that of the first member of the underlying vowel sequence, so there seems to be a kind of positional faithfulness constraint that requires the identity between a long vowel and the initial segment of its corresponding underlying vowel sequence. I formulate this constraint as follows:

(17) Constraint 49

**IDENT-LONGV$_{\text{INIT}}$-IO(Open)**: In open class an output long vowel and the first member of its corresponding input vowel sequence must have identical features except for length.[18]

[17] There are other languages that disallow diphthongs; Hungarian (Kenesei, Vago & Fenyvesi 1998:410-411) is one of such languages.

[18] The specification 'open' is necessary so that no violation is incurred by vowel coalescence observed in closed-class items with a final back vowel followed by the topic/contrast marker /(w)a/.

NB: This constraint is not violated when at least one segment of an underlying vowel sequence belongs to a closed-class item (e.g. /deka+i/ → [deke:] 'huge' (6a)).

When diphthongs are disallowed, the only bimoraic nucleus permitted in Japanese is a long vowel as a result of vowel coalescence (e.g. /ei/ → [e:], /aa/ → [a:]) or vowel lengthening (e.g. /a/ → [a:]). When two vowels in an open-class item coalesce and surface as a long vowel, it is always the values of the initial segment that the long vowel carries, so IDENT-LONGV$_{\text{INIT}}$-IO(Open) is considered to be undominated. Let us add *DIPHTHONG and IDENT-LONGV$_{\text{INIT}}$-IO(Open) to Tableaux (14) to see if the actual outputs are correctly selected as optimal for /osie+rɯ/ 'teach' and /ɯrɯow+ɯ/ 'become moist' this time.

(18) Tableaux for /osie+rɯ/ 'teach' and /ɯrɯow+ɯ/ 'become moist' (revised)[19]

| Input: /osie+rɯ/ | *DIPHTHONG | IDENT-LONGV$_{\text{INIT}}$-IO(Open) | IDENT-IO (height)(Op) | ONS | *i | UNIF |
|---|---|---|---|---|---|---|
| a. ☞ oʃierɯ | | | | * | * | |
| b. ose:rɯ | | *! | * | | | * |
| c. oʃi:rɯ | | | * | | * | *! |
| d. oʃierɯ | *! | | | | * | |

| Input: /ɯrɯow+ɯ/ | *DIPHTHONG | IDENT-LONGV$_{\text{INIT}}$-IO(Open) | IDENT-IO (height)(Op) | ONS | *ɯ | UNIF |
|---|---|---|---|---|---|---|
| e. ☞ ɯrɯoɯ | | | | * | *** | |
| f. ɯro:ɯ | | *! | * | | ** | * |
| g. ɯrɯ:rɯ | | | * | | *** | *! |
| h. ɯrɯoɯ | *! | | | | *** | |

We have so far confirmed that coalescence does not take place (i) between vowels that do not share the same value for [back] (e.g. /ai/ → *[e:]), whether within a morpheme or across a boundary, due to IDENT-IO(back), (ii) between vowels whose distance is more than one (e.g. /aɯ/ → *[o:]) in an open-class item due to IDENT-IO(height)(Open),[20] (iii) between non-high vowels (e.g. /ao/ → *[a:]) in an open-class item due to UNIFORMITY-IO >> *V[-high], and (iv) between a high vowel and a mid vowel in this order in an open-class

[19] In the tableau for /osie+rɯ/ 'teach', (18a) will still be selected as optimal even when IDENT-IO(anterior) is added because of IDENT-LONGV$_{\text{INIT}}$-IO(Open) >> IDENT-IO(anterior).

[20] There is no closed-class morpheme that contains /aɯ/ or /ɯa/.

item due to IDENT-LONGV$_{INIT}$-IO(Open). What we have not accounted for are (i) non-occurrence of coalescence between /e/ and /i/ and between /o/ and /ɯ/ across a morpheme boundary between an open-class item and another item and (ii) non-occurrence of vowel coalescence when a vowel sequence involves only closed-class items. In the next two subsections, therefore, we will look into these issues.

### 7.2.3 Between Vowels Not Sharing the Same Height: Across a Morpheme Boundary

A sequence of non-identical vowels across a morpheme boundary which involves at least one open-class item, surfaces as it is (see (2), (3) and (5)). This is due to ALIGN-L(Open) and/or ALIGN-R(Open). In Japanese, the underlying mora count is always preserved (e.g. /ei/ → [e:]) when two vowels coalesce so let us assume that the first vowel corresponds to the first mora and the second vowel to the second mora. Here the important point is that the first mora does not coincide with the right edge of a syllable and neither does the second mora to the left edge of a syllable, thus an ALIGNMENT violation will be incurred if two vowels coalesce across a morpheme boundary. Let us examine how ALIGNMENT (Open) constraints interact with others in the tableaux for /ne#iki/ 'the breathing in sleep' (/ne/: 'sleep', /iki/: 'breath') (2a), /o+ɯti/ '(your) house' (/o/: honorific prefix, /ɯti/: 'house') (2d) and /kaerɯ#o/ 'frog (ACC.)' (/kaerɯ/: 'frog' (51), /o/: accusative particle).

(19) Tableaux for /ne#iki/ 'the breathing in sleep', /o+ɯti/ '(your) house' and /kaerɯ#o/ 'frog (ACC.)'[21]

| Input: /ne$_1$#i$_2$ki/ | ALIGN-L (Open) | ALIGN-R (Open) | IDENT-IO (height)(Open) | ONSET | *i | UNIFORMITY -IO |
|---|---|---|---|---|---|---|
| a. ☞ neiki | | | | * | ** | |
| b. ne$_{12}$:ki | *! | * | * | | * | * |
| c. ni$_{12}$:ki | *! | * | * | | ** | * |

| Input: /o$_1$+ɯ$_2$ti/ | ALIGN-L (Open) | ALIGN-R (Open) | IDENT-IO (height)(Open) | ONSET | *ɯ | UNIFORMITY -IO |
|---|---|---|---|---|---|---|
| d. ☞ oɯtʃi | | | | * | * | |
| e. o$_{12}$:tʃi | *! | | * | | | * |
| f. ɯ$_{12}$:tʃi | *! | | | | * | * |

[21] Candidates with vowel deletion are omitted from these tableaux.

| Input: /kaerɯ₁#o₂/ | ALIGN-L (Open) | ALIGN-R (Open) | IDENT-IO (height)(Open) | ONSET | *ɯ | UNIFORMITY -IO |
|---|---|---|---|---|---|---|
| g. ☞ kaerɯo | | | | ** | * | |
| h. kaero₁₂: | | * | * | *! | | * |
| i. kaerɯ₁₂: | | * | | * | * | *! |

As seen in the above tableaux, when an open-class item is involved in a vowel sequence, ALIGN-L(Open) and/or ALIGN-R(Open) block vowel coalescence.[22]

7.2.4 Non-Occurrence of Vowel Coalescence in Closed Class

In closed class, coalescence between non-identical vowels is observed when a pronoun with a morpheme-final non-low vowel is followed by the topic/contrast marker /(w)a/ in casual speech,[23] as seen below.

(20) Vowel coalescence in closed class (from Chapter 6 (15))

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | bokɯ#(w)a | boka: | 'I (TOPIC)' |
| b. | ko+ko#(w)a | koka: | 'this place (TOPIC)' |

(21) Tableau for /bokɯ#(w)a/ 'I (Topic)' in casual speech

| Input: /bokɯ₁#(w)a₂/ | NO-PARSE -μ(DelSeg) | ONSET | *LAB | PARSE -μ | WT-IDENT | *ɯ | UNIFORM | *a |
|---|---|---|---|---|---|---|---|---|
| a. ☞ boka₁₂: | | | | | | | * | * |
| b. bokɯ₁₂: | | | | | | *! | * | |
| c. boka₁₂ | | | | *! | * | | * | * |
| d. boka₂ | | | | *! | | | | * |
| e. bokɯwa | | | *! | | | * | | * |
| f. bokɯa | | *! | | | | * | | * |
| g. boka₂: | *! | | | | * | | | * |

However, apart from the above-mentioned context, vowel coalescence does not take place even in closed class, although the open-class-specific IDENTITY constraints proposed in this

[22] We will discuss cases with a sequence of two identical vowels across a morpheme boundary, which involves a violation of ALIGNMENT(Open) constraints, in 7.3.

[23] In Chapter 5, 5.5.3 we considered that /w/ in the topic/contrast marker /wa/ becomes a ghost segment in casual speech.

chapter (i.e. IDENT-IO(height)(Open) and IDENT-LONGV$_{\text{INIT}}$-IO(Open)) have no effect on the configurations of closed-class items. In this subsection we will examine why vowel coalescence is blocked in closed-class items.

As far as I can think of, the only closed-class morpheme that contains a sequence of non-identical vowels is /gɯɾai/ 'about, to ... extent'. The reason why this morpheme does not undergo vowel coalescence is that high-ranking IDENT-IO(back), which is class non-specific, militates against any change in the values for [back].

(22) Tableau for /gɯɾai/ 'about, to ... extent'

| Input: /gɯɾai/ | IDENT-IO(back) | ONSET | *i | *ɯ | UNIFORMITY-IO |
|---|---|---|---|---|---|
| a. ☞ gɯɾai | | * | * | * | |
| b. gɯɾa: | *! | | | * | * |
| c. gɯɾo: | *! | | | * | * |
| d. gɯɾɯ: | *! | | | ** | * |
| e. gɯɾe: | *! | | | * | * |
| f. gɯɾi: | *! | | * | * | * |

A sequence of non-identical vowels across a morpheme boundary, on the other hand, is often created when a case particle /e/ (allative) or /o/ (accusative) follows a pronoun.

(23) Vowel sequence in closed class

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | kimi#e | kimie | 'to you' |
| b. | bokɯ#o | bokɯo | 'me (ACC.)' |

A pronoun followed by a case particle never undergoes vowel coalescence, unless the vowels across the boundary are identical (e.g. /kaɾe#e/ → [kaɾe:] 'to him'),[24] but our current constraint ranking cannot prevent vowel coalescence in this context when the vowels share the same value for [back], as seen in the following tableaux for /kimi#e/ 'to you' and /bokɯ#o/ 'me (ACC.)':

[24] We will discuss coalescence between two identical vowels in 7.3.

(24) Tableaux for /kimi#e/ ‘to you’ and /bokuɯ#o/ ‘me (ACC.)’[25]

| Input: /kimi$_1$#e$_2$/ | ONSET | PARSE-μ | *i | UNIFORMITY-IO |
|---|---|---|---|---|
| a. kimie | *! | | ** | |
| b. ☹ kime$_{12}$: | | | * | * |
| c. kimi$_{12}$: | | | **! | * |
| d. kime$_2$ | | *! | * | |

| Input: /bokuɯ$_1$#o$_2$/ | ONSET | PARSE-μ | *ɯ | UNIFORMITY-IO |
|---|---|---|---|---|
| e. bokuɯo | *! | | * | |
| f. ☹ boko$_{12}$: | | | | * |
| g. bokuɯ$_{12}$: | | | *! | * |
| h. boko$_2$ | | *! | | |

We thus need a constraint to account for non-occurrence of the vowel coalescence in question. The difference between (20a-b) and (23a-b) is that /(w)a/ is an adverbial particle while /e/ and /o/ are case particles, without which the listener might have difficulties in figuring out what case the preceding word is.[26] Thus, it is plausible to assume that there is a constraint that requires a case particle to stand alone without becoming part of the preceding syllable. I propose the following constraint:

(25) Constraint 50

**ALIGN-L(CaseParticle)**: The left edge of a case particle must coincide with the left edge of a syllable.[27]

As mentioned earlier, /kaɾe#e/ ‘to him’ surfaces as [kaɾe:], which violates ALIGN-L(Case Particle), so this constraint is not undominated. The fact that /kimi#e/ ‘to you’ surfaces as

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[25] Candidates without a particle (i.e. *[kimi$_1$] and *[bokuɯ$_1$]) are omitted from the tableaux. They cannot be optimal because they violate **M-PARSE(Particle)** which is considered to be undominated. The speaker may omit a certain particle in a sentence (e.g. [koɾe aŋeɾɯ] ‘(I’ll) give this (to you)’), but in such a case it is assumed that the particle is not present underlyingly (e.g. /ko+ɾe#age+ɾɯ/).

Candidates with the height of the case particle being altered (e.g. *[kimi:]) are also omitted. The fact that all the particles, including /(w)a/, always maintain their vowel height is due to another undominated constraint **IDENT-IO(height)(Particle)**. If the vowel height of particles were freely altered, the listener would have difficulties in grasping the syntactic function of each word within a sentence.

[26] /e/ and /o/ are the only case particles that begin with a vowel, and all the other case particles have an initial consonant (e.g. /no/: genitive particle; /de/: locative particle, /ni/: dative particle).

[27] See Chapter 9, 9.4.3 for discussion on a problem this constraint may hold.

[kimie] suggests that ALIGN-L(CaseParticle) must not be ranked lower than ONSET, but the fact that /kaɾe#e/ 'to him' does not surface as [kaɾie] just to avoid an ALIGN-L(Case Particle) violation indicates that this constraint must not be ranked higher than ONSET.

(26) Combined comparative tableau for /kimi#e/ 'to you' and /kaɾe#e/ 'to him'

| Input: | | ALIGN-L(CaseParticle) | ONSET |
|---|---|---|---|
| /kimi#e/ | kimie ~ kime: | W | L |
| /kaɾe#e/ | kaɾe: ~ kaɾie | L | W |

Therefore, the only place where ALIGN-L(CaseParticle) can be placed is in the same stratum as ONSET. Let us add this constraint to Tableaux (24).

(27) Tableaux for /kimi#e/ 'to you' and /bokɯ#o/ 'me (ACC.)' (revised)

| Input: /kimi$_1$#e$_2$/ | ALIGN-L(CaseParticle) | ONSET | PARSE-μ | *i | UNIFORMITY-IO |
|---|---|---|---|---|---|
| a. kimie | | * | | **! | |
| b. ☹ kime$_{12}$: | * | | | * | * |
| c. kimi$_{12}$: | * | | | **! | * |
| d. kime$_2$ | * | | *! | * | |

| Input: /bokɯ$_1$#o$_2$/ | ALIGN-L(CaseParticle) | ONSET | PARSE-μ | *ɯ | UNIFORMITY-IO |
|---|---|---|---|---|---|
| e. bokɯo | | * | | *! | |
| f. ☹ boko$_{12}$: | * | | | | * |
| g. bokɯ$_{12}$: | * | | | *! | * |
| h. boko$_2$ | * | | *! | | |

Although the actual outputs (27a) and (27e) are not eliminated by ONSET this time, the addition of ALIGN-L(CaseParticle) alone does not help them surface as optimal. Thus, we need another constraint, and that is **IDENT-IO(height)(Closed).**[28]

[28] The constraint we need must dominate *V subhierarchy so that the actual outputs are not eliminated by *V[+high], so IDENT-IO(height) cannot be the constraint we need. If we assume that IDENT-IO(height) is the one we are looking for, then /ei/ and /oɯ/ will never coalesce to surface as long vowels, as seen in the following tableau for /gakɯ+sei/ 'student'.

| Input: /gakɯ+se$_1$i$_2$/ | IDENT-IO(height)(Open) | ONSET | IDENT-IO(height) | *i | UNIFORMITY | *e |
|---|---|---|---|---|---|---|
| a. gakɯse$_{12}$: | * | | *! | | * | * |
| b. gakɯʃi$_{12}$: | * | | *! | * | * | |
| c. ☹ gakɯsei | | * | | * | | * |

(28) Constraint 51

**IDENT-IO(height)(Closed)**: No change in the values for height in closed-class items.

This constraint is violated when the final back vowel of a pronoun coalesces with /a/ in the topic/contrast marker /(w)a/ (e.g. /bokɯ#(w)a/ → [boka:] 'I (Topic)' (20a)) and, in order for a candidate with vowel coalescence (e.g. [boka:]) to beat a candidate with deletion of the final back vowel (e.g. [boka]), IDENT-IO(height)(Closed) must be ranked lower than PARSE-μ (see Tableau (21)). However, In order for [kimie] (27a) and [bokɯo] (27e) to beat *[kime:] (27b) and *[boko:] (27f), respectively, we need to rank IDENT-IO(height) (Closed) higher than the *V[+high] constraints.[29] Thus, the only place where it can be ranked is between PARSE-μ and *i. Let us redraw tableaux for /bokɯ#(w)a/ 'I (Topic)', /kimi#e/ 'to you' and /bokɯ#o/ 'me (ACC.)' with IDENT-IO(height)(Closed) to see if the actual output is selected as optimal in each case this time.

(29) Tableaux for /bokɯ#(w)a/ 'I (Topic)', /kimi#e/ 'to you' and /bokɯ#o/ 'me (ACC.)' (further revised)

| Input: /bokɯ$_1$#(w)a$_2$/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | PARSE -μ | WT-IDENT | IDENT(height) (Closed) | *ɯ |
|---|---|---|---|---|---|---|---|
| a. ☞ boka$_{12}$: | | | | | | ** | |
| b. bokɯ$_{12}$: | | | | | | ** | *! |
| c. boka$_{12}$ | | | | *! | * | ** | |
| d. boka$_2$ | | | | *! | | | |
| e. bokɯwa | | | *! | | | | * |
| f. bokɯa | | *! | | | | | * |
| g. boka$_2$: | *! | | | | * | | |

| Input: /kimi$_1$#e$_2$/ | ALIGN-L (CaseParticle) | ONSET | PARSE -μ | IDENT-IO (height)(Closed) | *i |
|---|---|---|---|---|---|
| h. ☞ kimie | | * | | | ** |
| i. kime$_{12}$: | * | | | *! | * |
| j. kimi$_{12}$: | * | | | *! | ** |
| k. kime$_2$ | * | | *! | | * |

[28] The domination of the *V subhierarchy by both IDENT-IO(height)(Open) and IDENT-IO(height)(Closed) ensures that vowel height is not altered randomly (e.g. /kimi/ → *[keme] 'you').

| Input: /bokɯ$_1$#o$_2$/ | ALIGN-L (CaseParticle) | ONSET | PARSE -μ | IDENT-IO (height)(Closed) | *ɯ |
|---|---|---|---|---|---|
| l. ☞ bokɯo | | * | | | * |
| m. boko$_{12}$: | * | | | *! | |
| n. bokɯ$_{12}$: | * | | | *! | * |
| o. boko$_2$ | * | | *! | | |

The above tableaux indeed confirm that the actual outputs are duly selected as optimal.

In addition to a pronoun followed by a vowel-initial particle, a sequence of non-identical vowels involving only closed-class items can be created when a classifier (and another suffix) is suffixed to a numeral (e.g. /hati#eN/ → [hatʃieN]/*[hate:N]/*[hatʃe:N] '8 yen', /go#ko#amaɾi/ → [gokoamaɾi]/*[goka:maɾi] 'about 5 (of those)', /ɾokɯ#okɯ/ → [lokɯokɯ]/*[loko:kɯ] '6 million',).[30] If we assume high-ranking **ALIGN(Classifier)**, which requires both edges of a classifier to coincide with a syllable edge, then we should be able to account for non-occurrence of vowel coalescence in this context as well.

### 7.2.5 Summary

In this section we have confirmed that in normal speech (i.e. non-vulgar speech) vowel coalescence does not take place in the following contexts:

(30) Contexts in which vowel coalescence is disallowed

a. In a vowel sequence in which the vowels do not share the same value for [back] (e.g. /oi/ → *[e:]), due to IDENT-IO(back) >> ONSET.

b. In a vowel sequence involving at least one open-class item in which a morpheme boundary intervenes between the vowels (e.g. /e+i/ → *[e:]), due to ALIGN-L (Open) >> ALIGN-R(Open), ONSET.

c. In a vowel sequence with no high vowel in open class (e.g. /ao/ → *[a:]), due to UNIFORMITY-IO >> *V[-high].

d. In a vowel sequence with rising sonority in open class (e.g. /ie/ → *[e:]), due to IDENT-LONGV$_{\text{INIT}}$-IO(Open) >> ONSET.

[30] There is one more context in which a sequence of non-identical vowels that share the same value for [back] is created at the surface level: a /w/-final auxiliary verb root (e.g. /simaw/ 'end up –ing') followed by a suffix with an initial back vowel. The fact that /te#simaw+ɯ/ surfaces as [tʃaɯ], not as *[tʃa:]/*[tʃo:]/*[tʃɯ:], cannot be accounted for with our current constraint hierarchy. We will discuss this issue in Chapter 9, 9.4.4.

e. In a vowel sequence involving a case particle (e.g. /kimi#e/ → *[kime:]), due to ALIGN-L(CaseParticle), IDENT-IO(height)(Open), ONSET >> IDENT-IO(height)(Closed) >> *V subhierarchy.

We also confirmed that coalescence between a high vowel and a mid vowel, in whichever order, to a high vowel (e.g. /ei/ → [i:], /ɯo/ → [ɯ:]) is not permissible due to *V[+high] >> UNIFORMITY-IO. This means that in open class the only sequences of non-identical vowels that can undergo coalescence are /ei/ and /oɯ/ with no morpheme boundary between the vowels and that they must surface as [e:] and [o:], respectively.[31]

## 7.3 COALESCENCE OF TWO IDENTICAL VOWELS

When two identical vowels occur consecutively within a morpheme or across a morpheme boundary, they usually coalesce and surface as a long vowel, as seen in (1a-b). Here are some more examples.

(31) Coalescence of two identical vowels[32]

| | Underlying | Surface | Gloss |
|---|---|---|---|
| a. | o+kaa+saN | oka:saN | 'mother' |
| b. | jɯɯ+ki | jɯ:ki | 'courage' |
| c. | oow+ɯ | o:ɯ | 'cover' |
| d. | tiisa+i | tʃi:sai | 'small' |
| e. | ooki+i | o:ki: | 'big' |
| f. | kaɾe#e | kaɾe: | 'to him' |
| g. | ko+ko#o | koko: | 'this place (ACC.)' |

The coalescence between two identical vowels does not violate any of the IDENTITY constraints proposed in the previous section (i.e. IDENT-IO(back), IDENT-IO(height)(Open), IDENT-LONGV$_{INIT}$-IO(Open) and IDENT-IO(height)(Closed)), whether or not there is a morpheme boundary between the two vowels. Let us first draw a tableau for /o+kaa+saN/ 'mother' to confirm that our current constraint ranking does opt for vowel coalescence.

[31] In closed class, /ɯ#(w)a/ → [a:] and [o#(w)a] → [a:] are attested, as we discussed in 7.2.4. Otherwise, vowel coalescence does not take place even in closed class.

[32] I consider that the underlying representation in each case has /V.V/, not /V:/, for the reason that the second V can be separated from the first V in unusually slow, careful speech.

(32) Tableau for /o+kaa+saN/ 'mother'[33]

| Input: /o+kaa+saN/ | CONTIG-IO(Open) | MAX-IO(Open) | ONSET | UNIFORMITY-IO |
|---|---|---|---|---|
| a. ☞ oka:saN | | | * | * |
| b. okaasaN | | | **! | |
| c. okasaN | | *! | * | |
| d. oka?asaN | *! | | * | |

In this tableau the actual output [oka:saN] is correctly selected as optimal, and these four constraints can account for coalescence between two identical vowels within an open-class non-root item, such as (31a) and (31b). When a sequence of two identical vowels occurs within a root, as seen in (31c) and (31d), the number of segments in the root decreases by one due to vowel coalescence but the mora count is preserved, thus GRWD>ROOT(Open) (see Chapter 5, 5.3.1) is still satisfied and the candidate with a long vowel duly surfaces as optimal.

(33) Tableau for /oow+ɯ/ 'cover'

| Input: /oow+ɯ/ | CONTIG-IO (Open) | *wV [-low] | GRWD >ROOT | MAX-IO (Open) | ONSET | MAX-IO (Root) | UNIFORM |
|---|---|---|---|---|---|---|---|
| a. ☞ o:ɯ | | | | * | ** | * | * |
| b. ooɯ | | | | * | ***! | * | |
| c. oɯ | | | * | *!* | ** | ** | |
| d. o:wɯ | | *! | | | * | | * |
| e. o?oɯ | *! | | | * | ** | * | |

When a sequence of identical vowels occurs across a morpheme boundary between a root and a suffix, as seen in /ooki+i/ 'big' (31e), ALIGN-R(Open) is violated but this violation is not fatal. Let us confirm that coalescence of two identical vowels in this context is also permitted by our constraint ranking in a tableau for /ooki+i/ 'big'.

[33] See Chapter 2, 2.3.4 for CONTIG-IO(Open) and its ranking.
CONTIG-IO(Open) will not be able to prevent a consonant from being inserted between two identical vowels within a closed-class item. There is only one closed-class item with two consecutive identical vowels in Japanese: /iie/ 'no'. However, this word usually surfaces as [ie], instead of *[i?ie], both in formal speech and in casual speech.

(34) Tableau for /ooki+i/ 'big'[34]

| Input: /ooki$_1$+i$_2$/ | ALIGN-R(Open) | IDENT-IO (height)(Open) | ONSET | IDENT-IO (height)(Closed) | *i | UNIFORMITY -IO |
|---|---|---|---|---|---|---|
| a. ☞ o:ki: | * | | * | | * | * |
| b. o:kii | | | ** | | **! | |
| c. o:kie | | | ** | *! | * | |
| d. o:kei | | * | **! | | * | |

We have so far confirmed that, within open-class items and between an open-class root and a suffix, two consecutive identical vowels must surface as a long vowel. Let us see if our constraint ranking can bring about the same outcome for two consecutive identical vowels across a morpheme boundary between two closed-class items, as seen in (31f) and (31g), in which the allative particle /e/ or the accusative particle /o/ follows an identical vowel.

(35) Tableaux for/kare#e/ 'to him' and /ko+ko#o/ 'this place (ACC.)'[35]

| Input: /kare$_1$#e$_2$/ | ALIGN-L (CaseParticle) | ONSET | PARSE -μ | IDENT(height) (Closed) | *i | UNIFORM | *e |
|---|---|---|---|---|---|---|---|
| a. kare$_{12}$: | * | | | | | *! | * |
| b. ☹ karee | | * | | | | | ** |
| c. karie | | * | | *! | * | | * |
| d. kare$_2$ | * | | *! | | | | * |

| Input: /ko+ko#o/ | ALIGN-L (CaseParticle) | ONSET | PARSE -μ | IDENT(height) (Closed) | *ɯ | UNIFORM | *o |
|---|---|---|---|---|---|---|---|
| e. koko$_{12}$: | * | | | | | *! | ** |
| f. ☹ kokoo | | * | | | | | *** |
| g. kokɯo | | * | | *! | * | | ** |
| h. koko$_2$ | * | | *! | | | | ** |

In the above tableaux, the actual outputs (35a) and (35e) lose to candidates with no vowel coalescence due to a UNIFORMITY-IO violation. The demotion of ALIGN-L(CaseParticle)

[34] Candidates that violate constraints ranked higher than ALIGN-R(Open), such as M-PARSE(tense), GRWD> ROOT(Open) and MAX-IO(Open), are omitted.
[35] *[kare?e] and *[koko?o] are omitted from the tableaux. The reason why these candidates are not optimal is that the case particles /e/ and /o/ are not allowed to have an onset. **ANCHOR-IO(Particle)** will do the job.

below ONSET will cause havoc to /kimi#e/ → [kimie] 'to you' and /bokɯ#o/ → [bokɯo] 'me (ACC.)' (see Tableaux (29)), so we must keep ALIGN-L(CaseParticle) and ONSET in the same stratum. In order to eliminate the unwanted candidates, *[kaɾee] (35b) and *[kokoo] (35f), we need a constraint ranked higher than ALIGN-L(CaseParticle) that prefers a long vowel to a sequence of two identical vowels. I propose the following constraint:

(36) Constraint 52

**OCP(IdentV)**: A sequence of two identical vowels is disallowed.[36]

In slow and careful speech an underlying sequence of two identical vowels can be pronounced as two monophthongs so OCP(IdentV) is not an undominated constraint but because it is not violated in normal speech, whether formal or casual, I consider that it is ranked in the second highest stratum.[37] Let us add OCP(IdentV) to Tableaux (35) and confirm that the actual outputs are correctly selected this time.

(37) Tableaux for/kaɾe#e/ 'to him' and /ko+ko#o/ 'this place (ACC.)' (revised)[38]

| Input: /kaɾe$_1$#e$_2$/ | OCP (IdentV) | ALIGN-L (CaseParticle) | ONS | PARSE -μ | IDENT(height) (Closed) | *i | UNIF |
|---|---|---|---|---|---|---|---|
| a. ☞ kaɾe$_{12}$: | | * | | | | | * |
| b. kaɾee | *! | | * | | | | |
| c. kaɾie | | | * | | *! | * | |
| d. kaɾe$_2$ | | * | | *! | | | |

| Input: /ko+ko#o/ | OCP (IdentV) | ALIGN-L (CaseParticle) | ONS | PARSE -μ | IDENT(height) (Closed) | *ɯ | UNIF |
|---|---|---|---|---|---|---|---|
| e. ☞ koko$_{12}$: | | * | | | | | * |
| f. kokoo | *! | | * | | | | |
| g. kokɯo | | | * | | *! | * | |
| h. koko$_2$ | | * | | *! | | | |

[36] When one of the vowels is oral and the other is nasal (e.g. [õo] as in /hoN#o/ → [hoõo] 'book (ACC.)') or one is long and the other is short (e.g. [o:o] as in /hoɯ#o/ → [ho:o] 'low (ACC.)'), OCP(IdentV) is not considered to be violated.

[37] The addition of OCP(IdentV) to our constraint hierarchy does not cause any problem with Tableaux (32), (33) and (34) because in all the tableaux the optimal candidates do not violate this constraint.

[38] Changing the weight (e.g. /kaɾe#e/ → *[kaɾe:e]) or the values for [nasal] (e.g. /kaɾe#e/ → *[kaɾẽe]) is not an option just to avoid OCP(IdentV) because both WT-IDENT-IO and IDENT-IO(nasal) are ranked higher than UNIFORMITY-IO.

In this section we have confirmed that, when two identical vowels occur in succession, they must surface as a long vowel, whether they are within a morpheme or across a morpheme boundary.[39] Before moving to the next section in which vulgarisms will be examined, let us recapitulate the constraints proposed in this chapter so far.

(38) Summary of constraints 4

a. Undominated constraints
   i. *DIPHTHONG
   ii. IDENT-LONGV$_{\text{INIT}}$-IO(Open)

b. Dominated constraints
   i. ALIGN-L(CaseParticle)
   ii. IDENT-IO(back)
   iii IDENT-IO(height)(Open)
   iv. IDENT-IO(height)(Closed)
   v. OCP(IdentV)

(39) Constraint ranking 26

CODACOND, CONTIG-IO(Open), **IDENT-LONGV$_{\text{INIT}}$-IO(Open)**, ***DIPHTHONG**, *wV[-low]

\>>

**OCP(IdentV)**

\>>

ALIGN-L(Open), GRWD>ROOT(Open), **IDENT-IO(back)**, MAX-IO(Open)

\>>

**ALIGN-L(CaseParticle)**, ALIGN-R(Open), **IDENT-IO(height)(Open)**, ONSET

\>>

*LAB

\>>

MAX-IO(Root)

\>>

PARSE-μ, WT-IDENT-IO

\>>

**IDENT-IO(height)(Closed)**

\>>

*i >> *ɯ

\>>

UNIFORMITY-IO

\>>

*e >> *o >> *a

[39] We did not discuss any case with a sequence of two identical vowels across an open-class item and a case particle (e.g. /to#o/ → [to:] 'door (ACC.)'). The actual output violates both ALIGN-R(Open) and ALIGN-L (CaseParticle) in the fourth stratum while *[toɯ] satisfies both at the expense of an ONSET violation. Thus, the latter appears to beat the former. The reason why such a candidate with the height of the case particle being altered is not optimal is that it violates undominated IDENT-IO(height)(Particle) (see fn.25).

## 7.4 VULGARISMS

The coalescence of /a/ and /i/ to [e:] is a cross-linguistically common process and is observed in Mongolian (Jôo 1989:15-16), Sanskrit (Foley 1977:22) and Tiberian Hebrew (Benua 1997:144), among others. Harris & Lindsay (2000) explain this vowel coalescence as follows:

> The phenomenon is straightforwardly represented as the compacting of two sequentially ordered elements into a single complex segment, [A]-[I] yielding [A, I] in the case of a-i > e. This account compares favourably with one based on articulatory features, in which one set of specifications has to be rewritten by another: in the case of a-i > e, [-high, +low, +back]-[+high, -low, -back] is arbitrarily replaced by [-high, -low, -back] (2000:191-192).

In Japanese, as discussed in 7.2, /ai/ → [e:] incurs multiple violations of IDENT-IO(height) (Open), while /ai/ → [ai] only involves a single violation of ONSET. The coalescence of /a/ and /i/ to [e:], therefore, does not take place within open-class items and, under ordinary circumstances, it does not take place even within closed-class items either due to IDENT-IO(back). However, it can take place in casual male speech when the speaker wishes to express 'roughness'. Also observed only in this speech are the coalescence of /o/ and /i/ to [e:] and that of /ɯ/ and /i/ to [i:], both of which involve a violation of IDENT-IO(back) as well. Here are some examples. (Those mentioned in (6) are also included.)

(40) Vulgarisms: rough way of speech[40]

| | Underlying | Surface (formal) | Surface (vulgar) | Gloss |
|---|---|---|---|---|
| a. | deka+i | dekai | deke: | 'huge' |
| b. | kitana+i | kitanai | kitane: | 'dirty' |
| c. | sɯgo+i | sɯŋoi | sɯŋe: | 'terrific, terrible' |
| d. | hido+i | hidoi | hide: | 'harsh, dreadful' |
| e. | samɯ+i | samɯi | sami: | 'cold' |
| f. | warɯ+i | warɯi | wari: | 'bad' |
| g. | na+i | nai | ne: | 'not exist, not have' |
| h. | mi+na+i | minai | mine: | 'not see/watch' |

[40] There is no adjective root that ends in /e/, thus /e+i/ → [e:] is never observed in vulgarisms.

This type of vowel coalescence started to be observed in the speech of the populace in the second half of the *Edo* period (1603-1868) (Tsukishima 1988:97), and craftsmen in Tokyo still use these coalesced vowels almost regardless of the part of speech (e.g. /dai+kɯ/ → [de:kɯ] 'carpenter'; Matsumura 1951:18). However, my intuitive assumption as a native Japanese speaker is that nowadays most male speakers who use vulgarisms limit its use to adjectives (e.g. (40a-f)) and the non-past negative form (e.g. (40g-h)). This means that, in any vowel sequence that undergoes coalescence in vulgarisms, the first and second vowels must be a root-final back vowel and the non-past tense morpheme /i/, respectively.[41] This precisely explains why vulgarisms do not target vowel sequences in /ko+itɯ/ 'this guy' (Hasegawa 1979:129), /oɾe#ga#ik+ɯ/ 'I will go' (Tsujimura 1996:102), and so forth.[42]

However, not every root followed by /i/ seems to readily undergo vowel coalescence. As Hasegawa (1979:129) points out, /ki+iɾo+i/ 'yellow (adj.)' does not seem to surface as ?[ki:ɾe:]; in fact, any adjective describing colour seems to resist vowel coalescence (e.g. /aka+i/ → ?[ake:] 'red', [ao+i] → ?[ae:] 'blue'). I believe that, generally speaking, adjectives with negative connotation (e.g. (40b), (40d), (40f)) and those that are mainly used in spoken language (e.g. (40a), (40c)) undergo vowel coalescence more readily than those with positive connotation and those mainly used in writing or in formal situations, and it seems to me that the coalescence of /a+i/ is much more frequent than the other two and that the least common is the coalescence of /ɯ+i/. This is exactly why [kɯɾe:] is most likely to be understood by the listener as the vulgar expression of /kɯɾa+i/ 'dark' rather than that of /kɯɾo+i/ 'black'. Nevertheless, the listener should still be able to understand just about any adjective with vowel coalescence when it is uttered in the right context, so let us assume in this thesis that the coalescence of /a+i/, /o+i/ and /ɯ+i/ to [e:], [e:] and [i:], respectively, is the norm in vulgarisms.

[41] Hasegawa (1979:129) considers that /ae/ → [e:] is one of the characteristics of male speech too (see also Tsujimura (1996:102)) but I regard it as non-standard because it is only used by a small number of male speakers, such as craftsmen and gangsters.

[42] Neither Hasegawa (1979) nor Tsujimura (1996) provides a straightforward account for the context in which vulgarisms occur.

In Japanese, as we saw in 7.2, /ei/ and /oɯ/ surface as [e:] and [o:], respectively, and we have just discussed that in vulgarisms /a+i/, /o+i/ and /ɯ+i/ coalesce to [e:], [e:] and [i:], respectively. This means that the values favoured by Japanese in the process of vowel coalescence are [-high, -low] (except when both vowels are [+high]) and [-back] (except when both vowels are [+back]).[43] Within the framework of OT, we accounted for /ei/ → [e:] and /oɯ/ → [o:] by placing UNIFORMITY-IO between *V[+high] (i.e. *i and *ɯ) and *V[-high] (i.e. *e, *o and *a) in 7.2.2, but we rejected any type of coalescence between a front vowel and a back vowel due to high-ranking IDENT-IO(back) in 7.2.1. Thus, in order to account for vowel coalescence observed in vulgarisms, we need to either rerank some of the constraints or introduce another or some other constraints. The easiest way to allow vowel coalescence in vulgarisms appears to be the downgrading of IDENT-IO(back) below ONSET. However, this solution poses two problems; (i) it will allow a back vowel and a front vowel to coalescence elsewhere as well, and (ii) when a back vowel and /i/ coalesce, [+back] will be preferred due to the *V subhierarchy, which is based on the sonority of vowels. For instance, /gɯrai/ 'about, to ... extent' (closed-class item) always surfaces as [gɯrai], regardless of the register of speech, but the demotion of IDENT-IO (back) below ONSET brings about an undesired outcome, as seen in the following tableau:

(41) Tableau for /gɯrai/ 'about, to ... extent'

| Input: /gɯrai/ | ONSET | IDENT-IO (back) | IDENT-IO (height)(Closed) | *i | UNIFORMITY -IO | *e | *a |
|---|---|---|---|---|---|---|---|
| a. gɯrai | *! | | | * | | | * |
| b. ☹ gɯra: | | * | ** | | * | | * |
| c. gɯre: | | * | ** | | * | *! | |
| d. gɯri: | | * | ** | *! | * | | |

Thus, we need to consider another solution.

In vulgarisms, vowel coalescence occurs across boundaries between an adjective root or the negative morpheme /na/ (or /ana/) and the non-past tense morpheme /i/. /na/ can

[43] This choice of values seems to be cross-linguistically common but, as seen in Old Latin (/ei/ → [i:], /ou/ → [u:], /oi/ → [u:] (Schein & Steriade 1986:702-703)), other choices are also attested.

actually be an adjective meaning 'non-existent' and any root with the negative morpheme inflects exactly in the same way as adjectives.

(42) Paradigms of /deka+i/ 'huge', /na+i/ 'not exist, not have' and /mi+na+i/ 'not see/ watch'

| | /deka+i/ | /na+i/ | /mi+na+i/ |
|---|---|---|---|
| Non-past affirmative form | deka-i | na-i | mina-i |
| Non-past negative form | deka-kɯnai | n/a | n/a |
| Past affirmative form | deka-katta | na-katta | mina-katta |
| Past negative form | deka-kɯnakatta | n/a | n/a |
| Adverbial form | deka-kɯ | na-kɯ | mina-kɯ |
| *Te*-form | deka-kɯte | na-kɯte | mina-kɯte |

Therefore, we can consider that the negative morpheme is a kind of adjective root, and perhaps we should rephrase the earlier statement as: vulgarisms target adjectives and adjective equivalents in the non-past tense. The question arising from here is why they never affect verbs. The answer is simple; no form of a verb has a vowel sequence across a boundary between a root and a suffix, with the exception of those of /w/-final verb roots followed by a non-low vowel (e.g. /aw+i+mas+ɯ/ → [aimasɯ] 'meet, see (POLITE)'). Another difference between adjective roots and verb roots is that the former can end in any of /i/, /ɯ/, /o/ and /a/ while the latter can only end in a consonant, /i/ or /e/. In other words, no verb root ends in a back vowel. Taking this fact into consideration, I propose the following anti-faithfulness constraint to account for vulgarisms:

(43) Constraint 53

**¬IDENT$_{\mathrm{FIN}}$-IO[+back](Root)**: It is not the case that the root-final [+back] segment and its output correspondent agree in the values for [back].

In normal speech (that is, non-vulgarisms), ¬IDENT$_{\mathrm{FIN}}$-IO[+back](Root) is assumed to be a low-ranking constraint so that both the adjective root-final vowel and the tense morpheme surface as they are (e.g. /deka+i/ → [dekai] 'huge'), but when the speaker wants to express 'roughness', it is promoted above IDENT-IO(back) to allow a back vowel and /i/ to surface as a long vowel across the root-suffix boundary.[44] Let us draw tableaux for /deka+i/ 'huge' (/deka/: open-class item) and /mi+na+i/ 'not see/watch' (/na/: closed-class item) to see the effect of ¬IDENT$_{FIN}$-IO[+back](Root). (Candidates that violate undominated M-PARSE(neg), M-PARSE(tense) and/or high-ranking MAX-IO(Open) are omitted.)

(44) Tableaux for /deka+i/ 'huge' and /mi+na+i/ 'not see/watch'[45]

| Input: /deka+i/ | ¬IDENT$_{FIN}$ [+back](Rt) | IDENT (back) | ALIGN -R(Op) | IDENT (height)(Op) | ONS | IDENT (height)(Cld) | *i |
|---|---|---|---|---|---|---|---|
| a. deke: | | * | * | * | | *! | |
| b. deki: | | * | * | **! | | | * |
| c. ☹ dekei | | * | | * | * | | * |
| d. deka: | *! | * | * | | | ** | |
| e. deko: | *! | * | * | * | | * | |
| f. dekɯ: | *! | * | * | ** | | | |
| g. dekai | *! | | | | * | | * |

| Input: /mi+na+i/ | ¬IDENT$_{FIN}$-IO [+back](Root) | IDENT-IO (back) | ONSET | IDENT-IO (height)(Cld) | *i | UNIFORMITY -IO |
|---|---|---|---|---|---|---|
| h. ☞ mine: | | * | | ** | * | * |
| i. mini: | | * | | ** | **! | * |
| j. minei | | * | *! | * | ** | |
| k. mina: | *! | * | | ** | * | * |
| l. mino: | *! | * | | ** | * | * |
| m. minɯ: | *! | * | | ** | * | * |
| n. minai | *! | | * | | ** | |

When the root-final back vowel belongs to a closed-class item, as seen in /mi+na+i/ 'not see/watch', our constraint ranking can correctly select the optimal candidate, but that is not the case when the vowel in question belongs to an open-class item due to the interaction of ALIGN-R(Open), IDENT-IO(height)(Open), ONSET and IDENT-IO(height)(Closed), as seen in the tableau for /deka+i/ 'huge'. In order for the actual output [deke:] (44a) to beat the

[44] ¬IDENT$_{FIN}$-IO[+back](Root) cannot be an undominated constraint because some adjectives (e.g. /ki+iro+i/ 'yellow') seem to resist vowel coalescence, but it must dominate IDENT-IO(back), hence ¬IDENT$_{FIN}$-IO[+back](Root) in the second stratum and IDENT-IO(back) in the third (cf 7.2.1 and fn.8).

[45] As mentioned in (17), vowel coalescence across the boundary between an adjective root and the tense morpheme does not incur a violation of IDENT-LONGV$_{INIT}$-IO(Open) because one of the segments involved in the coalescence does not belong to an open-class item.

incorrectly selected *[dekei] (44c), we need a constraint that can eliminate the latter before IDENT-IO(height)(Closed) eliminates the former.

In Chapter 2, 2.3, we introduced high-ranking DEP-V-IO to account for the preference for consonant assimilation over vowel insertion in the process of the formation of the *te*-form, with the exception of /s/-final root verbs. Vowel insertion is only observed on rare occasions in Japanese and, when it is observed, it is /i/ that is epenthesised due to two undominated constraints (i.e. DEP-IO[-high] and DEP-IO[+back]), as seen in /kas+te/ → [kaʃite] 'lending'; (see Chapter 2, 2.3.3). Dependence of vowels and vowel features upon the underlying representation is, thus, considered to be very important in Japanese. Based on this fact, I propose the following constraint:

(45) Constraint 54

**DEP-IO[-back]**: No insertion of [-back].

This constraint is violated when a front vowel is inserted or when a back vowel alone surfaces as a front vowel (but not when a front vowel alone surfaces as a back vowel). When a back vowel surfaces as a front vowel, [+back] is lost and [-back] is inserted instead, hence a violation of DEP-IO[-back]. When a back vowel coalesces with a front vowel and surfaces as a front vowel, on the other hand, it acquires the feature [+back] from the neighbouring segment so that [-back] is not considered to be inserted. Therefore, as the surface form of /deka+i/, *[dekei] (44c) violates DEP-IO[-back] but [deke:] (44a) does not.

(46) Violation and Non-violation of DEP-IO[-back]

i. Violation

[+back] [-back]

dek a i

e

ii Non-violation

[+back] [-back]

dek a i

e:

In regard to the ranking of this constraint, it must be placed no lower than ALIGN-R(Open), IDENT-IO(height)(Open) and ONSET so that [deke:] (44a) can beat *[dekei] (44c) (see Tableaux (44)) but, as long as it is dominated by the other two DEP-IO[F] constraints, /i/

will still be the epenthetic vowel so I rank it in the second stratum with DEP-V-IO.[46] Here are revised tableaux of (44) as well as a tableau for /kas+te/ 'lending'.

(47) Tableau for /kas+te/ 'lending'

| Input: /kas+te/ | CODA COND | CV LINK | DEP [+back] | DEP [-high] | ID(cont) [cor] | MAX [+obs][cor] | DEP -V | DEP [-back] |
|---|---|---|---|---|---|---|---|---|
| a. ☞ kaʃite | | | | | | | * | * |
| b. katte | | | | | *! | | | |
| c. kasse | | | | | *! | | | |
| d. kate | | | | | | *! | | |
| e. kase | | | | | | *! | | |
| f. kasete | | | | *! | | | * | * |
| g. kasɯte | | | *! | | | | * | |
| h. kasite | | *! | | | | | * | * |
| i. kaste | *! | | | | | | | |

(48) Tableaux for /deka+i/ 'huge' and /mi+na+i/ 'not see/watch' (revised)

| Input: /deka+i/ | DEP-IO [-back] | ¬IDENT$_{FIN}$-IO [+back](Root) | IDENT-IO (back) | ALIGN-R(Open) | IDENT-IO (height)(Open) | ONSET |
|---|---|---|---|---|---|---|
| a. ☞ deke: | | | * | * | * | |
| b. deki: | | | * | * | **! | |
| c. dekei | *! | | * | | * | * |
| d. deka: | | *! | * | * | | |
| e. deko: | | *! | * | * | * | |
| f. dekɯ: | | *! | * | * | ** | |
| g. dekai | | *! | | | | * |

| Input: /mi+na+i/ | DEP-IO [-back] | ¬IDENT$_{FIN}$-IO [+back](Root) | IDENT-IO (back) | ONS | IDENT-IO (height)(Cld) | *i | UNIF |
|---|---|---|---|---|---|---|---|
| h. ☞ mine: | | | * | | ** | * | * |
| i. mini: | | | * | | ** | **! | * |
| j. minei | *! | | * | * | * | ** | |
| k. mina: | | *! | * | | ** | * | * |
| l. mino: | | *! | * | | ** | * | * |
| m. minɯ: | | *! | * | | ** | * | * |
| n. minai | | *! | | * | | ** | |

[46] DEP-IO[-back] and DEP-IO[+back] cannot replace IDENT-IO(back) because these DEP-IO constraints cannot prevent coalescence between vowels that do not share the same value for [back].

With the promotion of only one constraint, namely, ¬IDENT$_{FIN}$-IO[+back](Root), we can successfully account for the antics of vulgarisms which are not observed in normal speech; (i) vowel coalescence only takes place across a morpheme boundary (e.g. /deka+i/ → [deke:] 'huge' but /gɯrai/ → [gɯrai]/*[gɯre:] 'about, to ...extent'), (ii) the coalescence must involve a back vowel and a front vowel (e.g. /kitana+i/ → [kitane:] 'dirty' but /a+ɯN/ → [aɯN]/*[o:N] 'inspiration and expiration'), and (iii) the coalescence only occurs in adjectives and the negative form in the non-past tense (e.g. /sɯgo+i/ → [sɯŋe:] 'terrific, terrible' but /ko+itɯ/ → [koitsɯ]/*[ke:tsɯ] 'this guy').

## 7.5. SUMMARY

In this chapter we first dealt with non-vulgar speech to examine the vowel coalescence observed in open class (i.e. /ei/ → [e:] and /oɯ/ → [o:] in single morphemes, and /$V_1$(+)$V_1$/ → [$V_1$:]), and accounted for non-occurrence of coalescence of the other vowel sequences. In Japanese, IDENT-IO(back) is a high-ranking constraint and it militates against coalescence of vowels with different values for [back] (e.g. /ae/ → *[a:]/*[o:]/*[e:]). Except for /ei/ → [e:], /oɯ/ → [o:] and /$V_1$(+)$V_1$/ → [$V_1$:], vowel coalescence is prevented in open class by the interaction of the following:

(49) Interaction of constraints to block vowel coalescence in open class

a. ALIGN-L(Open) >> ALIGN-R(Open), ONSET, which prevents $V_1$+$V_2$ → $V_1$: when $V_1$ and $V_2$ are not identical (e.g. /e+i/ → *[e:]).

b. IDENT-LONGV$_{INIT}$-IO(Open) >> ONSET, which prevents $V_1V_2$ → $V_2$: (e.g. /ie/ → *[e:]).

c. IDENT-IO(height)(Open) and ONSET ranked in the same stratum, which prevents coalescence of vowels whose distance is more than one (e.g. /aɯ/ → *[a:]/*[o:]/*[ɯ:]).

d. *V[+high] (i.e. *i, *ɯ) >> UNIFORMITY-IO >> *V[-high] (i.e. *e, *o, *a), which, in conjunction with (49c), prevents $V_1V_2$ → $V_1$ when $V_1$: is a high vowel (e.g. /ie/ → *[i:]), as well as coalescence between non-high vowels (e.g. /ao/ → *[a:]/*[o:]).

In closed class or across a boundary between an open-class item and a closed-class item, on the other hand, /$V_1$(+)$V_1$/ → [$V_1$:] and /V[+back]#(w)a/ → [a:] are the only vowel sequences that can undergo coalescence. When the case particle /e/ (allative) or /o/ (accusative) follows a non-identical vowel, they surface as a vowel sequence without coalescing (e.g. /kimi#e/ → [kimie]/*[kime:] 'to you'). This is because of the interaction of ALIGN-L(CaseParticle), ONSET and IDENT-IO(height)(Closed). By placing ALIGN-L (CaseParticle) and ONSET together in the same stratum and IDENT-IO(height)(Closed) lower than the other two constraints but higher than the *V subhierarchy, we managed to account for non-occurrence of vowel coalescence in 'non-open class' contexts as well.

In 7.4, vowel coalescence observed in vulgarisms (i.e. /a+i/ → [e:], /o+i/ → [e:], /ɯ+i/ → [i:]) was examined. The users of vulgarisms normally limit their use to adjectives and the negative form in the non-past tense. Based on this fact as well as the fact that vulgarisms involve a violation of IDENT-IO(back) by a root-final segment, I proposed an anti-faithfulness constraint that requires a root-final [+back] segment to surface as [-back], namely, ¬$\text{IDENT}_{\text{FIN}}$-IO[+back](Root), and suggested that vulgarisms should be accounted for by simply promoting this constraint above IDENT-IO(back) instead of invoking or reranking any other constraint. However, as mentioned earlier, in vulgarisms some types of adjectives undergo coalescence less readily than others and /ɯ+i/ → [i:] seems to be less common than /o+i/ → [e:], which in turn is less common than /a+i/ → [e:]. In order to fully account for vulgarisms, these issues require explaining, but I wish to leave further investigation to another occasion.

# CHAPTER EIGHT

## EMPHATIC EXPRESSIONS

### 8.1 INTRODUCTION

In Japanese, the speaker can geminate or prenasalise a consonant, and/or lengthen a vowel when he/she wants to express the degree of something emphatically, and this affects the configurations of adverbs and adjectives. Here are some examples.

(1) Emphatic expressions 1

i. Adverbs[1]

| | Underlying | Surface (formal) | Surface (emphatic) | Gloss |
|---|---|---|---|---|
| a. | totemo | totemo | tottemo | 'very' |
| b. | jahaɾi | jahaɾi | jappaɾi | 'as expected, after all' |
| c. | amaɾi | amaɾi | ammaɾi | 'not very/much' |
| d. | zeN+zeN | dzendzeN | dze:ndzeN | 'not at all' |
| e. | hoN+towɯ | honto: | ho:nto | 'really, truly' |

ii. Adjectives

| | Underlying | Surface (formal) | Surface (emphatic) | Gloss |
|---|---|---|---|---|
| a. | kitana+i | kitanai | kittanai | 'dirty' |
| b. | okasi+i | okaʃi: | okkaʃi: | 'funny, strange' |
| c. | jasɯ+i | jasɯi | jassɯi | 'cheap' |
| d. | omosiɾo+i | omoʃiɾoi | ommoʃiɾoi | 'interesting, amusing' |
| e. | hɯɾɯ+i | ɸɯɾɯi | ɸɯnlɯi | 'old' |
| f. | mɯzɯkasi+i | mɯdzɯkaʃi: | mɯndzɯkaʃi: | 'difficult' |
| g. | jasasi+i | jasaʃi: | jasaʃi:i | 'kind, easy' |
| h. | mazɯ+i | madzɯi | madzɯ:i | 'yucky, unwise' |
| i. | naga+i | naŋai | naŋa:i | 'long' |

Long vowels, voiceless geminates, nasal geminates and nasals followed by a voiced consonant are commonly observed in Yamato vocabulary (e.g. [oto:saN] 'father', [hotte] 'digging', [onna] 'woman', [tombo] 'dragonfly'), and all these emphatic forms do not

[1] See Martin (1952:68) for a brief discussion on 'impressionistic adverbs'.

violate any undominated or high-ranking constraint. In emphatic speech, however, configurations that are only found in Foreign vocabulary (i.e. gemination of voiced obstruents) or never found elsewhere in the language (i.e. the other types of gemination) are also tolerated, as seen in the following examples:

(2) Emphatic expressions 2

| | Underlying | Surface (formal) | Surface (emphatic) | Gloss |
|---|---|---|---|---|
| a. | jaba+i | jabai | jabbai | 'risky, unwise' |
| b. | kɯdo+i | kɯdoi | kɯddoi | 'tedious, importunate' |
| c. | mazɯ+i | madzɯi | maddzɯi[2] | 'yucky, unwise' |
| d. | sɯgo+i | sɯŋoi | sɯggoi | 'terrific, terrible' |
| e. | kaɾa+i | kaɾai | kallai | 'spicy' |
| f. | kajɯ+i | kajɯi | kajjɯi | 'itchy' |
| g. | kowa+i | kowai | kowwai | 'scary, scared' |
| h. | ao+i | aoi | aʔʔoi[3] | 'blue' |

In this chapter, we will focus on the emphatic forms of adjectives for the reason that they exhibit more diversity than adverbs, examine them from the point of view of the locus of gemination/lengthening/prenasalisation, sonority, acceptability and so forth, then attempt to account for the process of emphasis within the framework of Optimality Theory.

## 8.2 SURVEY

From November 2002 to January 2003, I conducted a survey, the purpose of which was to elucidate the following three issues: (i) what is acceptable as an emphatic form, (ii) what segment is more readily geminated or lengthened in terms of sonority, and (iii) where within a word gemination/lengthening/prenasalisation can take place more readily. The number of subjects who responded to my request to participate in the survey was 32 (15 males and 17 females, all native Japanese speakers with the age ranging from 16 to 69), and the method I took was as follows:

[2] As seen in (1.ii.h) and (2c), adjectives can have more than one emphatic form.

[3] The insertion and gemination of /ʔ/ is probably one of the least common ways of emphasising adjectives. In the survey I conducted in 2002-2003, 9 out of 30 subjects said that they might say [aʔʔoi] and 14 out of 30 said that they might say [aʔʔoːi]. We will discuss this survey in the next section.

<Method of the Survey>

Format: a written questionnaire, which consisted of the following sections:

Section A

- Questions about the subject's personal information, which included sex, age, birthplace, where they spent most of their time until mid-teens, where they live now, and whether they use VVN (voiced velar nasalisation).

Section B

- Questions about existing adjectives. A number of actual adjectives in the non-past affirmative form as well as some potential emphatic forms for each adjective were given. The subject was asked to read those emphatic forms aloud in a natural speed then to rate each of them from 1 to 5. 1 to 5 correspond to the following:

  1: I would often say it.
  2: I would sometimes say it.
  3: I might say it.
  4: I would probably not say it.
  5: I would never say it.

- Both the non-past affirmative form and the potential emphatic forms were given in Japanese. This is because Japanese characters are phonetic and, unlike English words (e.g. 'lead' [lid]/[led], 'row' [ɹoʊ]/[ɹaʊ]), there is only one way to pronounce each word.[4]

| | | | | | |
|---|---|---|---|---|---|
| e.g. 1. | やばい | [jabai] 'risky, unwise' | 2. | きたない | [kitanai] 'dirty'[5] |
| | やーばい | [ja:bai] | | きーたない | [ki:tanai] |
| | やっばい | [jabbai] | | きったない | [kittanai] |
| | やんばい | [jambai] | | きたーない | [kita:nai] |
| | やばーい | [jaba:i] | | きたんない | [kitannai] |
| | やーばーい | [ja:ba:i] | | きたなーい | [kitana:i] |
| | やっばーい | [jabba:i] | | きーたなーい | [ki:tana:i] |
| | やんばーい | [jamba:i] | | きったなーい | [kittana:i] |
| | | | | きたーなーい | [kita:na:i] |
| | | | | きたんなーい | [kitanna:i] |

[4] The pronunciation of some characters cannot be determined when they are given by themselves. For instance, っ and ー indicate the first half of a geminate and the second mora of a long vowel, respectively, but the contexts in which they are used can determine how they are pronounced within a given word.

[5] The phonetic transcription and the gloss are added here for the sake of the reader. They were not given in the actual questionnaire.

- The total number of adjectives tested in this section was 62 (18 disyllabic roots, 25 trisyllabic roots, 19 quadrisyllabic roots). Of them one trisyllabic root and four quadrisyllabic roots contained a geminate underlyingly.[6]

Section C

- Questions about non-existing adjectives. A number of nonsense adjectives in the non-past affirmative form as well as two potential emphatic forms for each adjective were given. The subject was asked to choose the one that sounds more natural as an emphatic form.

| | | | | | | |
|---|---|---|---|---|---|---|
| e.g. | 1. | あそくい | [asokɯi] | 2. | こくそい | [kokɯsoi] |
| | | あっそくい | [assokɯi] | | こっくそい | [kokkɯsoi] |
| | | あそっくい | [asokkɯi] | | こくっそい | [kokɯssoi] |

- The total number of adjectives tested in this section was eight (2 × 4 sets), all of which had a trisyllabic root. In each set, one had $C_1V_1.C_2V_2$ and the other had $C_2V_2.C_1V_1$ in their respective second and third syllables, as seen in the above examples.
- When creating nonsense words for Sections C and D, I included in these words combinations of consonants that are not commonly attested or never attested in existing adjectives.

Section D

- Questions about non-existing adjectives. A number of nonsense adjectives in the non-past affirmative form as well as some potential emphatic forms for each adjective were given. The subject was asked to rank those emphatic forms in the order of naturalness (1: the most natural, 2: the second most natural, and so forth).

| | | | | | | |
|---|---|---|---|---|---|---|
| e.g. | 1. | みらよい | [miɾajoi] | 2. | ほやるい | [hojaɾɯi] |
| | | みっらよい | [millajoi] | | ほっやるい | [hojjaɾɯi] |
| | | みんらよい | [minlajoi] | | ほんやるい | [hoõjaɾɯi] |
| | | みらっよい | [miɾajjoi] | | ほやっるい | [hojallɯi] |
| | | みらんよい | [miɾaãjoi] | | ほやんるい | [hojanlɯi] |

- The total number of adjectives tested in this section was 18 (2 × 3 sets, 6 × 2 sets). All the words in the first three sets had a trisyllabic root and all the words in the next

[6] See Appendix 4 for the full list of the adjectives (both existing and non-existing) which I used in the survey.

two sets had a quadrisyllabic root. In each set of two trisyllabic-root words, one had $C_1V.C_2V$ and the other had $C_2V.C_1V$ in their respective second and third syllables, as seen in the above examples; in each set of six quadrisyllabic-root words, each word had one of $C_1V.C_2V.C_3V$, $C_1V.C_3V.C_2V$, $C_2V.C_1V.C_3V$, $C_2V.C_3V.C_1V$, $C_3V.C_1V.C_2V$ and $C_3V.C_2V.C_1V$ in the second, third and fourth syllables. The aim was to cover all possible ways of ordering two consonants (i.e. two orders) and three consonants (i.e. six orders).

My expectations before the survey were as follows:

<Expectations>

1. Locus of vowel lengthening

   Judging from the fact that vulgarisms only target the root-final vowel, the lengthening of the root-final vowel might also be more widely accepted than that of any other vowel in the root so that the underlying phonotactics would be preserved root-internally. The least accepted, thus, would be that of a vowel in a non-initial, non-final position.

2. Segments to be geminated

   In Japanese, voiceless geminates and geminate nasals are commonly observed but never are the other geminates in Yamato vocabulary due to usually undominated NoVoiGem (Itô & Mester 1995b). Voiced geminate obstruents are permitted in Foreign vocabulary (see Chapter 2, fn.57) but geminate laterals and geminate glides are never observed in speech, except in emphatic expressions. Therefore, I expected that segments would be prone to be geminated in the following order:

   voiceless obstruents > nasals > voiced obstruents > laterals > glides

3. Locus of gemination

   Other conditions being equal, the onset of the second syllable would be the first to be geminated so that the 'emphatic' cue could be given to the listener as early a stage as possible. The least likely locus of gemination would be the onset of the root-final syllable. This expectation was mainly based on the analysis of my own speech.

4. Prenasalisation[7]

   Prenasalisation of voiced segments would be the least common among the three methods of emphasis. The locus of prenasalisation would be the first voiced segment, excluding vowels, from the left edge. Again, this was based on the analysis of my own speech, as well as for the reason given in 3.

5. Preference between gemination and vowel lengthening

   Vowel lengthening would be preferred to gemination because it would not affect the phonotactics root-internally.

6. Co-occurrence of emphasising methods

   Co-occurrence of gemination and vowel lengthening would be acceptable when the onset of the second syllable was geminated and the root-final vowel was lengthened. Co-occurrence of prenasalisation and vowel lengthening would be less acceptable. Co-occurrence of gemination and prenasalisation would be very unlikely because both would target the first consonant that can be geminated or prenasalised. Double occurrence of gemination and that of vowel lengthening would be avoided.

## 8.3 STATISTICS[8]

### 8.3.1 Vowel Lengthening

Let us start with the formation of the emphatic form by means of vowel lengthening. When a root consists of *n* syllables, there are *n* vowels that can be lengthened, and if we allow multiple vowel lengthening, the number of options will increase dramatically. In this subsection, we will find out (i) when only one vowel is lengthened within a root, which one is more likely to be lengthened, and (ii) whether multiple vowel lengthening is considered to be natural and acceptable.

In disyllabic roots, there are three possible ways to lengthen vowels: the first vowel, the root-final vowel and both. Of these three options, the one that was considered by the

[7] Prenasalisation only occurs to voiced segments due to *NÇ̥.

[8] Gender, age and regional differences are disregarded in the analysis because the data did not provide any distinctive tendencies between males and females, between the young and the old or between those in Tokyo and those in Kansai, etc.

subjects to be the most acceptable was the lengthening of the root-final vowel. The following table shows the average rating and acceptance rate[9] (i.e. the number of subjects who gave 1, 2 or 3 divided by the total number of subjects) of each option for 15 disyllabic roots tested in the questionnaire:[10]

(3) Vowel lengthening in disyllabic roots (/(C)$V_1$C$V_2$/)[11]

| Lengthened Vowel | Rating | | | Acceptance rate | | |
|---|---|---|---|---|---|---|
| | Highest | Lowest | Mean | Highest | Lowest | Mean |
| $V_2$ | 1.6 [ama:i] 'sweet' | 2.5 [jaba:i] 'risky' | 2.0 | 96.7% [ama:i] 'sweet' | 76.7% [jaba:i] 'risky' | 88.0% |
| $V_1$ | 2.6 [ma:ɾɯi] 'round' | 4.4 [kɯ:doi] 'round' | 4.1 | 70.0% [ma:ɾɯi] 'round' | 13.8% [i:tai] 'sore' | 27.1% |
| Both | 4.1 [i:ta:i] 'sore' | 4.5 [ja:sɯ:i] 'cheap' | 4.3 | 33.3% [ma:ɾɯ:i] 'round' | 10.0% [ja:sɯ:i] 'cheap' | 20.3% |

When the root consists of two syllables, the lengthening of the second vowel is by far the most natural choice and, although the lengthening of the first vowel is accepted by some, the majority do not seem to consider it to be acceptable. The lengthening of both vowels is the least accepted and in 12 out of 15 cases the subjects rated the form with double vowel lengthening lower than the form with the first vowel being lengthened.[12] In the process of vowel lengthening, it seems that all that matters is the locus and that the vowel features have nothing to do with the choice of vowels to be lengthened. Also, frequency does not

[9] I assume that both the actual rating and the actual acceptance rate are much higher in each case. I base my assumption on the fact that people quite often do not realise that they do use gemination, prenasalisation and/or vowel lengthening for emphasis. One example is Y who gave 5 to [sɯggoi] for /sɯgo+i/ 'terrific, terrible' when he saw it in the questionnaire; later, when I was talking with him, he did use [sɯggoi] and he himself noticed it, so he changed the rating of [sɯggoi] from 5 to 2.

[10] /tiisa/ 'small', /ooki/ 'big' and /ki+i+ɾo/ 'yellow' are excluded, as they already have a long vowel in their respective surface forms (i.e. [tʃi:sa], [o:ki], [ki:ɾo]) in formal speech.

[11] Note that in all the tables only one meaning is given to any word in order to save space. I believe that the high rating and high acceptance rate of [ma:ɾɯi] 'round' are due to a well-known juvenile song in which [ma:ɾɯi] is repeated to describe the moon. The second highest was [ka:jɯi] 'itchy' (rating: 3.9, acceptance rate: 36.7%).

[12] The three cases in which double vowel lengthening was rated higher than or equal to the lengthening of the first vowel were: /naga/ 'long' (higher), /ita/ 'sore' (higher) and /kɯdo/ 'tedious, importunate' (equal).

seem to play any role in determining whether the emphatic form with vowel lengthening is acceptable or not.[13]

Next, let us see which vowel is more likely to be lengthened in emphatic forms of 25 trisyllabic roots.

(4) Vowel lengthening in trisyllabic roots (/(C)$V_1CV_2CV_3$/)[14]

| Lengthened Vowel | Rating | | | Acceptance rate | | |
|---|---|---|---|---|---|---|
| | Highest | Lowest | Mean | Highest | Lowest | Mean |
| $V_3$ | 1.8<br>[oiʃi:i]<br>'delicious' | 3.0<br>[tsɯɾena:i]<br>'heartless' | 2.4 | 93.5%<br>[oiʃi:i]<br>'delicious' | 58.1%<br>[tsɯɾena:i]<br>'heartless' | 75.8% |
| $V_1$ | 3.5<br>[o:iʃi:]<br>'delicious' | 4.7<br>[ʃi:taʃi:]<br>'familiar' | 4.1 | 54.8%<br>[ka:wai:]<br>'cute' | 3.3%<br>[ʃi:kakɯi]<br>'square' | 25.9% |
| $V_2$ | 3.9<br>[ʃika:kɯi]<br>'square' | 4.7<br>[osa:nai]<br>'childish' | 4.5 | 26.6%<br>[ʃika:kɯi]<br>'square' | 3.2%<br>[akɯ:doi]<br>'vicious' | 14.0% |
| $V_1$ & $V_3$ | 3.5<br>[o:iʃi:i]<br>'delicious' | 4.8<br>[ʃi:kakɯ:i]<br>'square' | 4.3 | 48.4%<br>[o:iʃi:i]<br>'delicious' | 0.0%<br>[ʃi:kakɯ:i]<br>'square' | 21.4% |
| $V_2$ & $V_3$ | 4.3<br>[kɯja:ʃi:i]<br>'vexed' | 4.8<br>[osa:na:i]<br>'childish' | 4.6 | 22.6%<br>[jasa:ʃi:i]<br>'kind' | 3.2%<br>[osa:na:i]<br>'childish' | 11.2% |

As the above table clearly shows, the root-final vowel is still the most preferred vowel to be lengthened in trisyllabic roots. Some forms with the first vowel being lengthened or with double vowel lengthening scored relatively well, but any form with the second vowel being lengthened was rated poorly. It is, thus, assumed that vowel lengthening is more acceptable peripherally than medially. Let us check if this assumption proves right with quadrisyllabic roots.

[13] In the questionnaire there are five disyllabic roots that are ranked higher than /ama/ 'sweet' in the frequency ranking set by the National Institute of Japanese Language (1962) (i.e. /naga/ 'long', /aka/ 'red', /jasɯ/ 'cheap', /hɯɾɯ/ 'old' and /kowa/ 'scary, scared'). The average rating and acceptance rate of the emphatic forms with vowel lengthening of these five words were 2.0 and 90.0%, respectively, which are more or less the same as those for the rest of the roots.

[14] I did not give a form with the first two vowels or all three vowels being lengthened as options in the questionnaire because such a form simply does not sound natural to me at all.

(5) Vowel lengthening in quadrisyllabic roots (/(C)$V_1CV_2CV_3CV_4$/)[15]

| L/V | Rating | | | Acceptance rate | | |
|---|---|---|---|---|---|---|
| | Highest | Lowest | M | Highest | Lowest | Mean |
| $V_4$ | 1.8 [namanɯɾɯ:i] 'lukewarm' | 2.6 [kɯdaɾana:i] 'trivial' | 2.3 | 87.1% [namanɯɾɯ:i] 'lukewarm' | 64.5% [kɯdaɾana:i] 'trivial' | 76.2% |
| $V_1$ | 3.7 [kɯ:daɾanai] 'trivial' | 4.3 [i:soŋaʃi:] 'busy' | 4.0 | 41.9% [kɯ:daɾana:i] 'trivial' | 22.6% [i:soŋaʃi:] 'busy' | 30.8% |
| $V_2$ | 4.2 [ija:ɾaʃi:] 'indecent' | 4.8 [aɾi:ŋatai] 'gracious' | 4.6 | 29.0% [ija:ɾaʃi:] 'indecent' | 3.2% [aɾi:ŋatai] 'gracious' | 9.4% |
| $V_3$ | 4.5 [ɯtsɯkɯ:ʃi:] 'beautiful' | 4.8 [omoʃi:ɾoi] 'interesting' | 4.6 | 16.1% [namanɯ:ɾɯi] 'lukewarm' | 3.2% [omoʃi:ɾoi] 'interesting' | 10.2% |
| $V_1/V_4$ | 3.8 [ja:waɾaka:i] 'soft' | 4.5 [i:soŋaʃi:i] 'busy' | 4.2 | 38.7% [ja:waɾaka:i] 'soft' | 9.7% [i:soŋaʃi:i] 'busy' | 24.6% |
| $V_2/V_4$ | 4.2 [ija:ɾaʃi:i] 'indecent' | 4.8 [aɾi:ŋata:i] 'gracious' | 4.6 | 25.8% [ija:ɾaʃi:i] 'indecent' | 3.2% [aɾi:ŋata:i] 'gracious' | 10.9% |
| $V_3/V_4$ | 4.5 [namanɯ:ɾɯ:i] 'lukewarm' | 4.8 [kɯdaɾa:na:i] 'trivial' | 4.7 | 19.4% [namanɯ:ɾɯ:i] 'lukewarm' | 3.2% [kɯdaɾa:na:i] 'trivial' | 8.5% |

The above table shows the average ratings and acceptance rates of 13 quadrisyllabic roots.[16] The lengthening of the root-final vowel was the most favoured, then that of the first vowel. The lengthening of a medial vowel (i.e. $V_2$ or $V_3$) did not get much support. If two vowels are to be lengthened, the two peripheral vowels are more preferred than a medial vowel and the root-final vowel.

The figures presented in the above three tables clearly indicate that the most preferred locus of vowel lengthening is the root-final position and the least preferred is a root-medial position (i.e. any vowel except the first and root-final vowels), which is exactly what I

[15] /nama+nɯɾɯ/ 'lukewarm' scored comparatively well in the lengthening of $V_3$ as well as that of $V_3$ and $V_4$. I believe that this is due to the fact that $V_3$ is in fact the first vowel in the second morpheme.

[16] The statistics exclude /mɯzɯkasi/ 'difficult' and /tɯmaɾana/ 'bored' as well as roots with an underlying geminate. This is because I did not give some of the emphatic forms with vowel lengthening as options in order to give way to some other options so that I could check something else (i.e. prenasalisation of /z/ in /mɯzɯkasi/ (e.g. [mɯndzɯkaʃi:]), flap nasalisation in /tɯmaɾana/ (e.g. [tsɯmannai]). We will discuss prenasalisation in 8.3.4.

expected before the survey. The vowel lengthening scale, thus, can be determined as follows:

(6) Vowel lengthening scale

$V_{Fin} > V_{Init} > V_{Mid}$

### 8.3.2 Gemination

#### 8.3.2.1 Disyllabic Roots

In disyllabic roots, the only locus where gemination can take place is the onset of the second syllable. This is because the root-initial consonant cannot be geminated due to *COMPLEX (Prince & Smolensky 1993). In Yamato vocabulary, the only licit full geminates are those of voiceless obstruents (i.e. [pp], [tt], [ss] and [kk]) and those of nasals (i.e. [mm], [nn] and [ŋŋ]) in normal (that is, non-emphatic) speech, and gemination of voiced obstruents (i.e. [bb], [dd] and [gg])[17] and non-nasal sonorants (i.e. [ll], [jj] and [ww]) is not permissible due to undominated NOVOIGEM. Gemination of a glottal stop is also impermissible in normal speech. When emphasising adjectives, however, NOVOIGEM is apparently demoted to allow voiced segments to be geminated as well. The following table shows how the subjects judged the emphatic forms with gemination for 15 adjectives with a disyllabic root, as well as those for /ooki+i/ 'big' and /tiisa+i/ 'small', both of which already have two moras in the first syllable of their respective surface forms (i.e. [o:ki:], [tʃi:sai]).

(7) Gemination in disyllabic roots (/$(C_1)VC_2V$/)[18]

| Underlying | Emphatic | Gloss | Rating | Acceptance rate | Frequency No. |
|---|---|---|---|---|---|
| sɯgo+i | sɯggoi | 'terrific' | 1.7 | 93.3% | 2999.5 |
| jasɯ+i | jassɯi | 'cheap' | 2.1 | 86.7% | 336.0 |
| mazɯ+i | maddzɯi | 'yucky' | 2.5 | 80.0% | 2737.0 |
| hɯɾɯ+i | ɸɯllɯi | 'old' | 2.5 | 80.0% | 624.0 |
| jaba+i | jabbai | 'risky' | 2.4 | 73.3% | not ranked |

[17] When an underlying /z/ is geminated, it normally surfaces as [ddz] (e.g. /mazɯ+i/ → [maddzɯi] 'yucky, unwise' (2c)), thus [zz] does not occur under ordinary circumstances in Japanese.

[18] Frequency ranking is added to this table to show that frequency is not an important factor of judging the naturalness of each form.

| | | | | | |
|---|---|---|---|---|---|
| kaɾa+i | kallai | 'spicy' | 2.7 | 73.3% | not ranked |
| ita+i | ittai | 'sore' | 2.7 | 69.0% | 2166.0 |
| kɯdo+i | kɯdoi | 'tedious' | 3.0 | 60.0% | not ranked |
| naga+i | naggai | 'long' | 3.1 | 60.0% | 266.0 |
| aka+i | akkai | 'red' | 3.0 | 56.7% | 934.5 |
| kajɯ+i | kajɯi | 'itchy' | 3.1 | 50.0% | not ranked |
| kowa+i | kowwai | 'scary' | 3.5 | 43.3% | 1396.5 |
| ama+i | ammai | 'sweet' | 3.7 | 36.7% | 1548.5 |
| ao+i | aʔʔoi | 'blue' | 4.0 | 30.0% | 1744.5 |
| maɾɯ+i | mallɯi | 'round' | 3.8 | 26.7% | 2737.0 |
| ooki+i | o:kki: | 'big' | 4.4 | 12.9% | 98.0 |
| | okki: | | 1.4 | 93.5% | |
| tiisa+i | tʃi:ssai | 'small' | 4.5 | 16.1% | 330.0 |
| | tʃissai | | 2.0 | 90.3% | |
| | tʃittʃai | | 1.6 | 93.5% | |

The emphatic form whose rating and acceptance rate were the highest was that of /sɯgo+i/ 'terrific, terrible', in which NoVoiGem is violated. Although its frequency ranking is not very high in written language, its use in spoken language is one of the highest among adjectives due to its additional function as an emphasiser (e.g. /sɯgo+i#omosiɾo+i/ 'very interesting'). [jassɯi] 'cheap' (86.7%), [maddzɯi] 'yucky, unwise' (80.0%) and [ɸɯllɯi] 'old' (80.0%) were also accepted rather favourably, while [mallɯi] 'round' (26.7%), [aʔʔoi] 'blue' (30.0%) and [ammai] 'sweet' (36.7%) were rated relatively poorly. It is likely that this is due to the fact that the former group of adjectives are more 'gradable', thus, can be expressed more emphatically than the latter group of adjectives (except for /ama+i/ 'sweet'). The results shown in the above table are intriguing in many ways. For instance, among the three emphatic forms with [ll], [ɸɯllɯi] 'old' was one of the most widely accepted while [mallɯi] 'round' was one of the most poorly rated (this may be in part due to frequency). Similarly, more than 90% accepted [sɯggoi] 'terrific, terrible' while only 60% said yes to [naggai] 'long' (this cannot be ascribed to frequency).[19] In normal speech [mm] is perfectly acceptable but not [jj] or [ww], yet the

[19] We will discuss [sɯggoi]~[sɯŋŋoi] 'terrific' and [naggai]~[naŋŋai] 'long' in relation to VVN in 8.3.4.

emphatic form with a geminated glide was rated more favourably than that with a geminated nasal.[20] What we can see from the data is that, no matter what the onset of the second syllable is (including 'nil'), it can be geminated (in the case of 'nil' [ʔʔ] is inserted) but that whether the emphatic form with gemination is acceptable or not depends more on individual words and, perhaps, on individual speakers than on frequency or on the segment itself.[21]

Of these 20 emphatic forms, [o:kki:] 'big' (12.9%) and [tʃi:ssai] 'small' (16.1%) were rated extremely poorly, compared with all the others. This is because both forms violate *3μ (Kager 1999) and the speakers of Japanese try to avoid this violation by shortening the preceding vowel. The high acceptance rates for [okki:] (93.5%), [tʃissai] (90.3%) and [tʃitʃsai] (93.5%)[22] support this claim (see Chapter 6, 6.6 for discussion on 'inverse CL' of these words). We will discuss how *3μ affects the configurations of emphatic forms later in 8.4.5.

8.3.2.2 Trisyllabic Roots

When the root consists of three syllables, there are two loci where gemination can occur: the onset of the second syllable and that of the third syllable. My expectation prior to the survey was that (i) the onset of the second syllable would be preferred to that of the third syllable as the locus of gemination and (ii) obstruents would be more readily geminated than sonorants, with the exception of nasals, taking into consideration the phonotactics of normal (i.e. non-emphatic) Japanese speech. In this subsection, as well as in the next subsection, we will look into the relationship between the preferred locus of gemination and the segment to be geminated in order to determine which factor, the locus or the sonority of the segment, takes precedence in the process of emphasis. Let us first look at adjectives with a trisyllabic root in which the onset of the second syllable is an obstruent.

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[20] We will discuss avoidance of nasal gemination in 8.6.3.

[21] However, unlike emphatic forms with vowel lengthening, frequency does seem to have some effect on the subjects' judgement of emphatic forms with gemination; for instance, the emphatic forms of low-frequency adjectives with a longer root generally scored more poorly than those of high-frequency counterparts when it comes to gemination. Hay, et al. (1999) also argue, by examining Oprah Winfrey's speech, that frequent words carry the brunt of the stylistic workload and there is much more style-shifting than infrequent words.

[22] /tiisa+i/ → [tʃittʃai] involves more than just gemination and vowel shortening. See Hamano (1986) for symbolic use of palatalisation.

(8) Gemination in trisyllabic roots 1 – $C_2$ in /($C_1$)V.$C_2$V.$C_3$V/: obstruent[23]

i. $C_2$: voiceless obstruent, $C_3$: voiceless obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /t/ - /s/ | sitasi+i | ʃittaʃi: | 'familiar' | 4.0 | 32.3% |
| | | ʃitaʃʃi: | | 4.1 | 25.8% |
| /s/ - /s/ | jasasi+i | jassaʃi: | 'kind' | 2.7 | 71.0% |
| | | jasaʃʃi: | | 4.5 | 16.1% |
| /k/ - /s/ | okasi+i | okkaʃi: | 'strange' | 2.3 | 83.9% |
| | | okaʃʃi: | | 4.3 | 19.4% |
| /k/ - /k/ | si+kakɯ+i | ʃikkakɯi | 'square' | 4.3 | 20.0% |
| | | ʃikakkɯi | | 3.6 | 36.7% |

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /s/ - /k/ | asokɯ+i | assokɯi | nonsense word | 1: 19 | 2: 13 | | 59.3% |
| | | asokkɯi | | 1: 13 | 2: 19 | | 40.6% |
| /k/ - /s/ | kokɯso+i | kokkɯsoi | nonsense word | 1: 17 | 2: 15 | | 53.1% |
| | | kokɯssoi | | 1: 15 | 2: 17 | | 46.9% |

ii. $C_2$: voiceless obstruent, $C_3$: voiced obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /k/ - /d/ | akɯdo+i | akkɯdoi | 'vicious' | 3.4 | 51.6% |
| | | akɯddoi | | 4.2 | 22.6% |

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /s/ - /d/ | kisɯdo+i | kissɯdoi | nonsense word | 1: 19 | 2: 13 | | 59.3% |
| | | kisɯddoi | | 1: 13 | 2: 19 | | 40.6% |

iii. $C_2$: voiceless obstruent, $C_3$: sonorant

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /t/ - /n/ | kitana+i | kittanai | 'dirty' | 2.2 | 83.9% |
| | | kitannai | | 4.9 | 0.0% |
| /s/ - /n/ | osana+i | ossanai | 'childish' | 3.2 | 48.4% |
| | | osannai | | 4.8 | 3.2% |
| /k/ - /ɾ/ | akaɾɯ+i | akkaɾɯi | 'light, bright' | 2.7 | 74.2% |
| | | akallɯi | | 4.7 | 9.7% |

[23] In the "order of naturalness" columns, the numbers given next to 1, 2, ... correspond to the number of subjects who considered each candidate to be the most natural, the second most natural, ..., and "% of 1" refers to the percentage of those who considered the candidate to be the most natural. In the case of [assokɯi], for instance, 19 and 13 subjects considered it to be the most natural and the second most natural, respectively, thus 59.3% of the subjects considered [assokɯi] to be the most natural.

iv. $C_2$: voiced obstruent, $C_3$: voiceless obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /b/ - /s/ | sabisi+i | sabbiʃi: | ‘lonely’ | 3.2 | 58.1% |
| | | sabiʃʃi: | | 4.1 | 29.0% |
| /z/ - /k/ | mizika+i | middʒikai | ‘short’ | 3.5 | 51.6% |
| | | midʒikkai | | 4.1 | 25.8% |
| /g/ - /s/ | hagesi+i | haggeʃi: | ‘fervant’ | 3.1 | 54.8% |
| | | haŋeʃʃi: | | 4.2 | 25.8% |

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /d/ - /s/ | hadosɯ+i | haddosɯi | nonsense word | 1: 14 | 2: 18 | | 43.8% |
| | | hadossɯi | | 1: 18 | 2: 14 | | 56.3% |

v. $C_2$: voiced obstruent, $C_3$: voiced obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /b/ - /z/ | mabɯza+i | mabbɯzai | nonsense word | 1: 12 | 1: 20 | | 37.5% |
| | | mabɯddzai | | 1: 20 | 1: 12 | | 62.5% |
| /z/ - /b/ | tozabɯi+i | toddzabɯi | nonsense word | 1: 16 | 1: 16 | | 50.0% |
| | | tozabbɯi | | 1: 16 | 1: 16 | | 50.0% |

vi. $C_2$: voiced obstruent, $C_3$: sonorant

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /b/ - /n/ | abɯna+i | abbɯnai | ‘dangerous’ | 2.6 | 71.0% |
| | | abɯnnai | | 4.8 | 3.2% |
| /b/ - /j/ | mabajɯ+i | mabbajɯi | ‘radiant’ | 3.5 | 48.4% |
| | | mabajjɯi | | 4.7 | 6.5% |
| /g/ - /j/ | hagajɯ+i | haggajɯi | ‘irritated’ | 3.6 | 38.7% |
| | | haŋajjɯi | | 4.6 | 9.7% |

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /z/ - /ɾ/ | kezerɯ+i | keddzerɯi | nonsense word | 1: 23 | 2: 8 | | 74.2% |
| | | kezellɯi | | 1: 8 | 2: 23 | | 25.8% |

As far as the existing words with an obstruent as $C_2$ are concerned, the one with geminated $C_2$ is always preferred, in most cases overwhelmingly, regardless of $C_3$, with the exception of [ʃikakkɯi] ‘square’.[24] However, the same cannot be said of the nonsense words. When $C_2$ is voiceless, the one with geminated $C_2$ is still favoured but the margin is small in each

[24] This is probably due to the fact that the root is composed of two morphemes (i.e. /si/ ‘four’ and /kakɯ/ ‘angle, corner’) and that $C_3$ of the root is, in fact, $C_2$ of the second morpheme.

case. When $C_2$ is voiced and $C_3$ is an obstruent, the one with geminated $C_3$ seems to be slightly more favoured, but when $C_3$ is not an obstruent, the gemination of $C_2$ is overwhelmingly favoured. From the data presented above, it is assumed that, generally speaking, the gemination of $C_2$ is perceived as more natural than that of $C_3$ when $C_2$ is an obstruent. Let us see if this is also the case with adjectives with a trisyllabic root in which $C_2$ is a sonorant.

(9) Gemination in trisyllabic roots 2 – $C_2$ in /$(C_1)V.C_2V.C_3V$/: sonorant

i. $C_2$: nasal, $C_3$: obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /m/ - /t/ | tɯmeta+i | tsɯmmetai | 'cold' | 3.8 | 35.5% |
| | | tsɯmettai | | 3.8 | 38.7% |
| /n/ - /k/ | minikɯ+i | minnikɯi | 'ugly' | 4.3 | 19.4% |
| | | minikkɯi | | 4.0 | 29.0% |
| /n/ - /s/ | tanosi+i | tannoʃi: | 'happy' | 4.0 | 32.3% |
| | | tanoʃʃi: | | 4.3 | 25.8% |

ii. $C_2$: nasal, $C_3$: sonorant

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /m/ - /ɾ/ | jamoɾo+i | jammoɾoi | nonsense word | 1: 20 | 2: 12 | | 62.5% |
| | | jamolloi | | 1: 12 | 2: 20 | | 37.5% |
| /n/ - /j/ | honajɯ+i | honnajɯi | nonsense word | 1: 25 | 2: 7 | | 78.1% |
| | | honajjɯi | | 1: 7 | 2: 25 | | 21.9% |

iii. $C_2$: liquid, $C_3$: obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | | | Acceptance rate |
|---|---|---|---|---|---|---|---|
| /ɾ/ - /s/ | ɯɾesi+i | ɯlleʃi: | 'glad' | 3.3 | | | 48.4% |
| | | ɯɾeʃʃi: | | 4.3 | | | 22.6% |
| /ɾ/ - /d/ | sɯɾɯdo+i | sɯllɯdoi | 'sharp' | 3.6 | | | 45.2% |
| | | sɯɾɯddoi | | 4.4 | | | 19.4% |
| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
| /ɾ/ - /z/ | noɾɯze+i | nollɯzei | nonsense word | 1: 15 | 2: 16 | | 48.4% |
| | | noɾɯddzei | | 1: 16 | 2: 15 | | 51.6% |

iv. $C_2$: liquid, $C_3$: sonorant

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /ɾ/ - /n/ | tɯɾena+i | tsɯllenai | 'heartless' | 4.0 | 29.0% |
| | | tsɯɾennai | | 4.8 | 6.5% |

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /ɾ/ - /m/ | koɾomo+i | kollomoi | nonsense word | 1: 15 | 2: 17 | | 46.9% |
| | | koɾommoi | | 1: 17 | 2: 15 | | 53.1% |
| /ɾ/ - /j/ | miɾajo+i | millajoi | nonsense word | 1: 16 | 2: 15 | | 51.6% |
| | | miɾajjoi | | 1: 15 | 2: 16 | | 48.4% |

v. $C_2$: glide, $C_3$: obstruent

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /j/ - /s/ | kɯjasi+i | kɯjjaʃi: | 'vexed' | 3.3 | 61.3% |
| | | kɯjaʃʃi: | | 3.8 | 38.7% |
| /w/ - /d/ | kiwado+i | kiwwadoi | 'hair-breadth' | 3.7 | 48.4% |
| | | kiwaddoi | | 4.4 | 25.8% |

vi. $C_2$: glide, $C_3$: sonorant

| /$C_2$/-/$C_3$/ | Underlying | Emphatic | Gloss | Order of naturalness | | | % of 1 |
|---|---|---|---|---|---|---|---|
| /j/ - /n/ | mojɯna+i | mojjɯnai | nonsense word | 1: 7 | 2: 25 | | 21.9% |
| | | mojɯnnai | | 1: 25 | 2: 7 | | 78.1% |
| /j/ - /ɾ/ | hojaɾɯ+i | hojjaɾɯi | nonsense word | 1: 17 | 2: 14 | | 54.8% |
| | | hojallɯi | | 1: 14 | 2: 17 | | 45.2% |

Among the existing words with a sonorant in $C_2$, the preferred emphatic form is still the one with geminated $C_2$, except for [tsɯmettai] and [minikkɯi], in both of which the geminated $C_3$ is a voiceless stop. However, the nonsense words tell a different story; when there is a choice between a nasal and a glide, a geminated nasal seems to be a lot more acceptable than a geminated glide, and when the choice is between a nasal and a liquid, a geminated nasal seems to be slightly more favoured than a geminated liquid (see (9.ii), (9.iv) and (9.vi)). Apart from these combinations, it is hard to tell which segment is more likely to be geminated.

In both (8) and (9), the results from the existing words and those from the nonsense words did not agree; the subjects overwhelmingly preferred the gemination of $C_2$ to that of $C_3$ for the existing words in most cases, but they seemed to prefer the gemination of voiceless obstruents and nasals to that of the others for the nonsense words. Judging from this fact, it is very likely that many of the subjects psychologically could not consider all those nonsense words with gemination as emphatic forms of adjectives and that they could not help but judge the naturalness of such words according to general phonotactics of Japanese (see 8.1).[25] Nowadays, one can encounter new nouns (e.g. names of technical innovations) quite frequently, but new adjectives are seldom created and are hard to come across.[26] Therefore, it is easily assumed that, even when the subjects, who are not used to be exposed to new adjectives, were instructed to consider nonsense words as adjectives, they simply could not. One piece of evidence to support my assumption is the fact that the majority rated nonsense emphatic forms with prenasalisation (e.g. [konlomoi] for /koromo+i/) higher than their counterparts with a voiced geminate (e.g. [kollomoi] for /koromo+i/), despite the fact they almost completely disregarded any emphatic form with presanalisation in the existing words section.[27] The nonsense words sections were added to the questionnaire so that combinations of consonants that are not attested in existing words could also be put to the test. However, it does not seem that we can take the results from these sections into much consideration and, for this reason, I will refrain from showing the data of the emphatic forms of nonsense words in the rest of this chapter.

According to Kirchner (1998a, 1998b, 2001), more effort is required to produce a geminate continuant consonant than a geminate stop and to produce a voiced geminate obstruent than a voiceless geminate. If we solely consider the results from the existing words section, however, $C_2$ is the preferred locus of gemination in trisyllabic roots, whether it is an obstruent or a sonorant and whether it is voiceless or voiced.[28] Therefore, as far as the process of emphasis is concerned, the locus of gemination seems to take precedence over the ease of gemination. In the next subsection we will discuss (i) whether the emphatic forms of adjectives with a quadrisyllabic root show the same results, (ii) if $C_2$ is

[25] Vitevitch, et al. (1997) demonstrate in their experiments on English nonsense words that the subjects judge non-words constructed to have highly frequent segments and segmental transitions more 'English-like' than non-words with low probability phonotactic patterns (cf. Hay, et al. (2003) who claim that perception, production and well-formedness all depend on lexical frequency). Thomas (2004) also demonstrates in his study of /el/~/æl/ merger that the subjects do not judge existing words and nonsense words quite equally.

[26] I can only think of /dasa+i/ 'uncool', /naɯ+i/ 'fashionable, trendy' and /omokɯro+i/ 'a little interesting' as adjectives newly created in the last few decades.

[27] For instance, [ambɯnai] for /abɯna+i/ 'dangerous' was rated 4.6 on average with the acceptance rate of 9.7%, while [abbɯnai] gained 2.6 and 71.0%. See 8.3.4 for further discussion on prenasalisation.

[28] Except when a nasal occupies $C_2$ and a voiceless obstruent occupies $C_3$. We will discuss this in 8.6.3.

the most preferred locus of gemination and which comes second, $C_3$ or $C_4$, and (iii) whether the choice between $C_3$ and $C_4$ has anything to do with sonority.

8.3.2.3 Quadrisyllabic Roots

A quadrisyllabic root has three potential loci of gemination, the onsets of the second, third and fourth syllables. Let us first look at cases in which the onsets of both the second and fourth syllables are voiceless consonants.

(10) Gemination in quadrisyllabic roots 1 – $C_2$ and $C_4$ in /$(C_1)V.C_2V.C_3V.C_4V$/: voiceless obstruents[29]

i. $C_3$: voiceless obstruent

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /t/-/k/-/s/ | ɯtɯkɯsi+i | ɯttsɯkɯʃi: | 'beautiful' | 3.5 | 48.4% |
| | | ɯtsɯkkɯʃi: | | 4.8 | 3.2% |
| | | ɯtsɯkɯʃʃi: | | 4.7 | 12.9% |

ii. $C_3$: voiced obstruent

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /s/-/g/-/s/ | isogasi+i | issoŋaʃi: | 'busy' | 2.5 | 71.0% |
| | | isoggaʃi: | | 4.6 | 12.9% |
| | | isoŋaʃʃi: | | 4.2 | 25.8% |

iii. $C_3$: nasal

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /k/-/m/-/s/ | jakamasi+i | jakkamaʃi: | 'noisy' | 2.4 | 83.9% |
| | | jakammaʃi: | | 5.0 | 0.0% |
| | | jakamaʃʃi: | | 4.5 | 16.1% |

iv. $C_3$: liquid

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /t/-/ɾ/-/s/ | ataɾasi+i | attaɾaʃi: | 'new' | 2.8 | 71.0% |
| | | atallaʃi: | | 4.6 | 3.2% |
| | | ataɾaʃʃi: | | 4.3 | 22.6% |

[29] Quadrisyllabic roots with /s/ as $C_4$ are relatively common, but I could not think of any existing adjective root with /p/, /t/ or /k/ as $C_4$ at the time I was preparing the questionnaire, except for /atataka+i/ 'warm', which usually surfaces as [attakai] in casual speech, and those with /ppo+i/ (e.g. /otoko+ppo+i/ 'manly'), /tta+i/ (/kɯsɯgɯ+tta+i/ 'ticklish') and /kko+i/ (e.g. /sɯbasi+kko+i/ 'nimble').

In each of the above four cases, the acceptance rate of the form with geminated $C_2$ is overwhelmingly higher than the other two. While the difference in both the rating and the acceptance rate between the form with geminated $C_3$ and that of geminated $C_4$ is not outstanding, the gemination of $C_4$ is always favoured, regardless of the sonority of $C_3$. It seems that there is the following scale for the locus of gemination: $C_2 > C_4 > C_3$, and that it is usually fixed, no matter what segment occupies each position. Let us find out if this applies to other combinations of segments.[30]

(11) Gemination in quadrisyllabic roots 2 – $C_2$ in /($C_1$)V$C_2$V$C_3$V$C_4$V/: voiced obstruent

i. $C_3$: voiceless obstruent, $C_4$: voiceless obstruent

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /z/-/k/-/s/ | mɯzɯkasi+i | mɯddzɯkaʃi: | 'difficult' | 2.7 | 64.5% |
| | | mɯdzɯkkaʃi: | | 4.5 | 9.7% |
| | | mɯdzɯkaʃʃi: | | 4.5 | 16.1% |

ii. $C_3$: voiceless obstruent, $C_4$: nasal

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /z/-/k/-/n/ | azi+ke+na+i | addʒikenai | 'dreary' | 3.4 | 45.2% |
| | | adʒikkenai | | 4.4 | 19.4% |
| | | adʒikennai | | 4.9 | 0.0% |

iii. $C_3$: liquid, $C_4$: nasal

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /d/-/ɾ/-/n/ | kɯdaɾana+i | kɯddaɾanai | 'trivial' | 2.0 | 83.9% |
| | | kɯdallanai | | 4.8 | 3.2% |
| | | kɯdaɾannai | | 4.9 | 3.2% |

In this group of words with a voiced obstruent in $C_2$, the most preferred locus of gemination is still $C_2$, but in two out of three cases the least preferred is $C_4$, instead of $C_3$, and in both cases $C_4$ is a nasal. Once again, gemination of nasals is considered to be less natural than that of other segments. Here is another piece of evidence to prove the speakers' perception of gemination of nasals at the surface level as unnatural: the data on roots with a nasal in $C_2$:

[30] As mentioned earlier, the data do not include the results of nonsense words, thus there are combinations of segments that cannot be put to the test when such combinations are not attested in existing words.

(12) Gemination in quadrisyllabic roots 3 – $C_2$ in /($C_1$)V.$C_2$V.$C_3$V.$C_4$V/: nasal

i. $C_3$: voiceless obstruent, $C_4$: liquid

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /m/-/s/-/ɾ/ | omosiɾo+i | ommoʃiɾoi | 'interesting' | 3.3 | 51.6% |
| | | omoʃʃiɾoi | | 4.2 | 25.8% |
| | | omoʃilloi | | 4.5 | 12.9% |

ii. $C_3$: nasal, $C_4$: voiceless obstruent

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /n-m-s/ | tanomosi+i | tannomoʃi: | 'reliable' | 4.1 | 22.6% |
| | | tanommoʃi: | | 4.9 | 0.0% |
| | | tanomoʃʃi: | | 4.2 | 25.8% |

iii. $C_3$: nasal, $C_4$: liquid

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /m/-/n/-/ɾ/ | nama+ | nammanuɯɾɯi | 'lukewarm' | 4.1 | 29.0% |
| | nɯɾɯ+i | namannɯɾɯi | | 4.8 | 6.5% |
| | | namanɯllɯi | | 4.1 | 29.0% |

vi. $C_3$: liquid, $C_4$: nasal[31]

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /m/-/ɾ/-/n/ | tɯmaɾana+i | tsɯmmannai | 'boring' | 4.4 | 19.4% |
| | | tsɯmallanai | | 4.6 | 9.7% |
| | | tsɯmaɾannai | | 4.7 | 6.5% |

With the exception of [ommoʃiɾoi] (12.i), no form with a geminated nasal scored higher than 4.0 and was accepted by more than 30% of the subjects, regardless of the position of the nasal. Here, avoidance of nasal gemination is obvious (cf. /ama+i/ 'sweet' (7), /tɯmeta+i/ 'cold' (9.i), /minikɯ+i/ 'ugly' (9.i)). A nasal cluster is perfectly acceptable in Japanese (e.g. /saNma/ → [samma] 'mackerel', /oNna/ → [onna] 'woman', /kaNgae/ → [kaŋŋae] 'thought, idea') but gemination of a nasal at the surface level is apparently not.[32]

Let us now move to adjectives with a quadrisyllabic root in which $C_2$ is a liquid or a glide. When $C_2$ is a nasal, its gemination is not considered to be natural by many, in spite

[31] Note that /tɯmaɾana+i/ 'boring, bored' usually surfaces as [tsɯmannai] in casual speech. For this reason I gave [tsɯmmannai] instead of [tsɯmmaɾanai] as an option in the questionnaire.

[32] See 8.6.3 for an OT account of avoidance of nasal gemination.

of the fact that a nasal cluster complies with Japanese phonotactics. Gemination of a liquid or a glide is against the normal phonotactics in Japanese but, as we saw in the previous subsections, it is acceptable in emphatic speech. The following is how our subjects rated emphatic forms with liquid or glide gemination in $C_2$:

(13) Gemination in quadrisyllabic roots 4 – $C_2$ in /$(C_1)VC_2VC_3VC_4V$/: liquid or glide

i. $C_2$: liquid, $C_3$: voiced obstruent, $C_4$: voiceless obstruent

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /ɾ/-/g/-/t/ | aɾ+i+gata+i | alliŋatai | 'gracious' | 3.8 | 45.2% |
| | | aɾiggatai | | 4.6 | 9.7% |
| | | aɾiŋattai | | 4.5 | 16.1% |

ii. $C_2$: glide, $C_3$: liquid, $C_4$: voiceless obstruent

| /$C_2$-$C_3$-$C_4$/ | Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|---|
| /w/-/ɾ/-/k/ | jawaɾaka+i | jawwaɾakai | 'soft' | 3.5 | 51.6% |
| | | jawallakai | | 4.6 | 16.1% |
| | | jawaɾakkai | | 4.2 | 25.8% |
| /j/-/ɾ/-/s/ | ijaɾasi+i | ijjaɾaʃi: | 'indecent' | 3.5 | 41.9% |
| | | ijallaʃi: | | 4.1 | 25.8% |
| | | ijaɾaʃʃi: | | 3.9 | 35.5% |

In all three cases, gemination of $C_2$ is the most favoured and that of $C_3$ the least, which is in accordance with the conclusion drawn from the data in (10).

Although the preference of $C_4$ over $C_3$ cannot be established from (13) alone because in all the cases $C_4$ is less sonorous than $C_3$ and the preference may be due to the sonority of the segment, we should still be able to consider from all the data presented in this subsection that there is a general tendency that $C_2$ is by far the most preferred locus of gemination, followed by $C_4$ then $C_3$, and that which segment to be geminated in the process of emphasis is determined solely by its position and not by its sonority, except for nasals.

#### 8.3.2.4 Roots with an Underlying Geminate

In Japanese, single morphemes containing two geminates are non-existent. This may be by chance or due to the OCP. If the OCP is the reason, then we should expect that roots with an underlying geminate would not have an emphatic form with another geminate. In order to find out if double occurrence of gemination is avoided in making emphatic forms, the emphatic forms of the following five adjectives with an underlying geminate were given to the subjects for evaluation: /kattarɯ+i/ 'languid', /mottaina+i/ 'wasteful', /sɯbasi+kko+i/ 'nimble', /madarɯ+kko+i/ 'sluggish' and /wasɯre+ppo+i/ 'forgetful', and here is how the subjects judged them.

(14) Gemination in roots with an underlying geminate

| Underlying | Emphatic | Gloss | Rating | Acceptance rate |
|---|---|---|---|---|
| kattarɯ+i | kattallɯi | 'languid' | 4.4 | 22.6% |
| mottaina+i | mottainnai | 'wasteful' | 4.8 | 3.2% |
| sɯbasi+kko+i | sɯbbaʃikkoi | 'nimble' | 4.3 | 19.5% |
| | sɯbaʃʃikkoi | | 4.5 | 16.1% |
| madarɯ+kko+i | maddarɯkkoi | 'sluggish' | 4.2 | 22.6% |
| | madallɯkkoi | | 4.5 | 12.9% |
| wasɯre+ppo+i | wassɯreppoi | 'forgetful' | 4.3 | 16.1% |
| | wasɯlleppoi | | 4.5 | 12.9% |

As clearly seen in the above table, the acceptance rate is less than 25% in each case, which means that more than three quarters of the subjects considered these emphatic forms with two geminates as unnatural.[33] Thus, it is most likely that the OCP is active in the process of emphasis.

In 8.3.2, we have examined emphatic forms with gemination. It seems that, theoretically, any non-initial consonant can be geminated to create an emphatic form if we disregard naturalness. Let us first discuss the locus of gemination. When a nasal occupies the onset of the second syllable ($C_2$) and a voiceless stop follows somewhere in the root (e.g. /tɯmeta+i/ 'cold', /minikɯ+i/ 'ugly'), the gemination of the obstruent seems to be slightly more favoured, but otherwise the most preferred locus of gemination is $C_2$, no matter what segment occupies that position, followed by the onset of the root-final syllable ($C_3$ or $C_4$ or even $C_5$, depending on the length of the root). The least favoured locus of

[33] When a root already contains a geminate, the most preferred choice of emphasising the word is to lengthen the root-final vowel. The average rating and acceptance rate of the emphatic forms of these five adjectives with the lengthening of the root-final vowel were 2.2 and 78.0%, respectively.

gemination is any onset between the second and final syllables. A number of emphatic forms of nonsense words did not comply with this generalisation and the ones with a geminated obstruent, regardless of its position, were often favoured.[34] The subjects were of course not familiar with such nonsense words and it seems that some could not help but assess those emphatic forms with gemination in the light of general Japanese phonotactics, not the special phonotactics of the emphatic form of adjectives.[35] Segments most preferred to be geminated are voiceless stops, followed closely by voiceless fricatives. In contrast with general Japanese phonotactics, the gemination of a liquid or a glide seems to be more accepted by many subjects than that of a nasal. Generally speaking, there seem to be the following two gemination scales in the process of emphasis:

(15) Gemination scales

a. Loci:[36]
$C_2 > C_{Fin} > C_{Mid}$

b. Segments:
voiceless stop > voiceless fricative > voiced stop > liquid > glide > nasal

Note that (15b) only partially resembles the sonority scale. In the special phonotactics of the emphatic forms, voiced stops are placed lower than voiceless fricatives and nasals are ranked at the bottom of the scale.

Before the survey I expected that $C_{Fin}$ would be more resistant to gemination than $C_{Mid}$, although the difference between $C_{Fin}$ and $C_{Mid}$ is almost marginal, and that nasals would be more readily geminated than liquids, but otherwise, the results of the survey more or less confirmed my expectations.

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[34] Examples include: /noɾɯze+i/ ([noɾɯddzei] > [nollɯdzei]; most favoured to least favoured), /eɾiseta+i/ ([eɾisettai] > [eɾissetai] > [ellisetai]), /kaɾinobi+i/ ([kaɾinobbiː] > [kallinobiː] > [kaɾinnobiː]). Also see (8.iv), (9.iii), (9.iv) and (9.vi).

[35] This was apparent in rating the emphatic forms of /honajɯ+i/ (9.ii) and /mojɯna+i/ (9.vi). In both cases, the preference for the gemination of the nasal was overwhelming.

[36] It is worth noting that this scale is almost identical to that of word recognition (see Horowitz, et al. (1968), Horowitz, et al. (1969) and Nooteboom (1981), among others). In terms of recognising an emphatic form as an adjective, what matters to the listener seems to be the features of segments, not the weight of each segment, thus it is quite likely that the listener can still recognise an emphatic form of any type on condition that he/she knows the word.

### 8.3.3 Choice Between Gemination and Vowel Lengthening

When there is a choice between gemination and vowel lengthening in the process of emphasis, which is more preferred? Let us compare the ratings and acceptance rates of emphatic forms with gemination to those of emphatic forms with vowel lengthening.

(16) Comparison between gemination and vowel lengthening[37]

| | No. of syllables | Rating | | | Acceptance rate | | |
|---|---|---|---|---|---|---|---|
| | | Highest | Lowest | Mean | Highest | Lowest | Mean |
| Gemination ($C_2$) | 2 | 1.7 | 4.0 | 2.9 | 93.3% | 26.7% | 61.3% |
| | 3 | 2.2 | 4.3 | 3.4 | 83.9% | 19.4% | 49.9% |
| | 4 | 2.0 | 4.1 | 3.2 | 83.9% | 22.6% | 56.5% |
| Vowel lengthening (root-final) | 2 | 1.6 | 2.5 | 2.0 | 96.7% | 76.7% | 88.0% |
| | 3 | 1.8 | 3.0 | 2.4 | 93.5% | 58.1% | 75.8% |
| | 4 | 1.8 | 2.6 | 2.3 | 87.1% | 64.5% | 76.2% |
| Both | 2 | 2.1 | 3.8 | 2.9 | 86.2% | 36.7% | 67.7% |
| | 3 | 2.2 | 4.2 | 3.5 | 87.1% | 29.0% | 48.8% |
| | 4 | 2.8 | 4.2 | 3.4 | 74.2% | 29.0% | 51.4% |

In 45 out of 53 cases, the emphatic form with vowel lengthening scored better both in the rating and in the acceptance rate, while in only 6 cases the emphatic form with gemination scored better in both.[38] From the above data, we can see that (i) vowel lengthening is a preferred choice in the process of emphasis, regardless of the number of syllables within a root, (ii) emphatic forms with both gemination and vowel lengthening are almost equally rated and accepted to those with gemination alone, and (iii) disyllabic roots are slightly more likely to be emphasised than longer roots.

### 8.3.4 Prenasalisation

Prenasalisation is another way of making an emphatic form of an adjective when the root contains a voiced segment,[39] as seen below.

[37] The data include 15 disyllabic roots, 24 trisyllabic roots and 14 quadrisyllabic roots. /ooki/ 'big', /tiisa/ 'small', /ki+iro/ 'yellow', /tɯmarana/ 'bored, boring' and roots with an underlying geminate are excluded.

[38] The six adjectives are /sɯgo/ 'terrific, terrible', /okasi/ 'strange, funny', /kɯdarana/ 'trivial', /jakamasi/ 'noisy', /isogasi/ 'busy' and /mezɯrasi/ 'unusual'. [jabbai] 'risky, unwise' was rated slightly higher than [jaba:i] while the acceptance rate of the latter was slightly higher than that of the former. [jassɯi] and [jasɯ:i] 'cheap' were equally accepted though the former was rated higher.

[39] Emphasis by means of prenasalisation does not take place when a root does not contain a voiced consonant due to undominated *NC̥ in Yamato vocabulary.

(17) Emphatic expressions 3

| | Underlying | Surface (formal) | Surface (emphatic) | Gloss |
|---|---|---|---|---|
| a. | sɯgo+i | sɯŋoi | sɯŋŋoi[40] | 'terrific, terrible' |
| b. | maɾɯ+i | maɾɯi | manlɯi | 'round' |
| c. | sabiʃi+i | sabiʃi: | sambiʃi: | 'lonely' |
| d. | mizika+i | midʒikai | mindʒikai | 'short' |
| e. | jawaɾaka+i | jawaɾakai | jaãwaɾakai | 'soft' |

The following table shows how the subjects rated the emphatic forms with prenasalisation, according to the locus and the number of syllables in the root:[41, 42]

(18) Prenasalisation (/(C)$V_1$.$C_2V_2$.$C_3V_3$.$C_4V_4$/)

| Locus | No. of syllables | Rating | | | Acceptance rate | | | No. of words |
|---|---|---|---|---|---|---|---|---|
| | | Highest | Lowest | Mean | Highest | Lowest | Mean | |
| $V_1\_C_2$ | 2 | 3.5 | 4.7 | 4.4 | 43.3% | 6.7% | 17.6% | 7 |
| | 3 | 4.6 | 4.9 | 4.7 | 9.7% | 3.2% | 8.3% | 6 |
| | 4 | 4.1 | 4.7 | 4.3 | 29.0% | 6.7% | 21.0% | 6 |
| $V_2\_C_3$ | 3 | 4.9 | 5.0 | 5.0 | 0.0% | 0.0% | 0.0% | 2 |
| | 4 | 4.9 | 5.0 | 4.9 | 9.7% | 0.0% | 1.6% | 8 |
| $V_3\_C_4$ | 4 | | | 4.7 | | | 12.9% | 1 |

The average rating and acceptance rate of [sɯŋŋoi] (17a) are 3.5 and 43.3%, respectively, but no other emphatic form with prenasalisation scored better than 4.0 or higher than 30.0%,[43] so we should consider that emphasis by means of prenasalisation is not widely

[40] [sɯŋŋoi] may be pronounced as [sɯŋgoi] by those who do not use VVN (voiced velar nasalisation).

[41] The adjective roots used for these data include the following: /akaɾɯ/ 'light, bright', /akɯdo/ 'vicious', /hagajɯ/ 'irritated, impatient', /hagesi/ 'fervent, violent', /hɯɾɯ/ 'old', /jaba/ 'risky, unwise', /kaɾa/ 'spicy', /kɯdo/ 'tedious, importunate', /maɾɯ/ 'round', /naga/ 'long', /sɯgo/ 'terrific, terrible'; /abɯna/ 'dangerous', /mabajɯ/ 'dazzling, radiant', /mizika/ 'short', /sabisi/ 'lonely', /sɯɾɯdo/ 'sharp', /tɯɾena/ 'cold-hearted', /ɯɾesi/ 'glad'; /aɾ+i+gata/ 'gracious', /ataɾasi/ 'new', /azikena/ 'dreary', /ijaɾasi/ 'indecent', /isogasi/ 'busy', /jawaɾaka/ 'soft', /kɯdaɾana/ 'trivial, worthless', /mɯzɯkasi/ 'difficult', /mezɯɾasi/ 'unusual', /nama+ nɯɾɯ/ 'lukewarm', /tɯmaɾana/ 'boring, bored'.

[42] Prenalisation with the lengthening of the root-final vowel is also possible. In some cases, the emphatic form with both scored slightly better than the one with prenaslisation alone (e.g. [jaãwaɾaka:i] – rating: 4.1, acceptance rate: 29.0%; [jaãwaɾakai] – rating: 4.2, acceptance rate: 25.8%).

[43] /naga+i/ → [naŋŋai] 'long' involves the same process, but its rating and acceptance rate were much lower, compared with those of [sɯŋŋoi] (rating: 4.2, acceptance rate: 20.0%). I believe that this is due to the fact that /sɯgo+i/ is often used as an emphasiser in speech and the listener is much more accustomed to its emphatic forms (e.g. [sɯggoi] (93.3%), [sɯgo:i] (83.3%), [sɯggo:i] (76.7%)) than those of /naga+i/.

accepted. Let us, therefore, restrict ourselves to accounting for /g/ → [ŋŋ] in this subsection.

As we saw in 8.3.2.1, /sɯgo+i/ 'terrific, terrible' can be realised as [sɯggoi] when one wishes to emphasise it. In fact, as far as this word is concerned, the gemination of /g/ is the most commonly used and accepted way of emphasising it (rating: 1.7, acceptance rate: 93.3%). When I was recording a conversation between a husband and a wife in December 2001, I noticed that the wife, who nasalises intervocalic /g/, used both [sɯggoi] and [sɯŋŋoi], and that was when I decided to find out if there is any relationship between those who use VVN and those who use [sɯŋŋoi]. My assumption was as follows: if VVN precedes gemination for emphasis in derivation, then the users of VVN should only use [sɯŋŋoi], and since emphasis by means of prenasalisation is not widely accepted, those who never nasalise intervocalic /g/ would not readily accept [sɯŋŋoi].

(19) Derivational theoretical analysis of emphasising /sɯgo+i/ 'terrific, terrible'

i. User of VVN

| | |
|---|---|
| | /sɯgo+i/ |
| VVN | sɯŋoi |
| gemination | sɯŋŋoi |
| | [sɯŋŋoi] |

ii. Non-User of VVN

| | |
|---|---|
| | /sɯgo+i/ |
| VVN | n/a |
| gemination | sɯggoi |
| | [sɯggoi] |

Of 32 subjects who returned the questionnaire, 9 identified themselves as a user of VVN and 9 as a non-user of VVN, and the rest answered 'do not know'. The following table shows how the subjects judged [sɯggoi] and [sɯŋŋoi]:

(20) [sɯggoi] vs. [sɯŋŋoi][44]

| VVN | [sɯggoi] | | [sɯŋŋoi] | |
|---|---|---|---|---|
| | Rating | Acceptance rate | Rating | Acceptance rate |
| Users | 1.8 | 87.5% | 4.0 | 37.5% |
| Non-users | 1.8 | 100.0% | 3.5 | 37.5% |
| 'Do not know' | 1.6 | 92.9% | 3.2 | 50.0% |
| Average | 1.7 | 93.3% | 3.5 | 43.3% |

[44] The users of VVN gave a lower rating and acceptance rate to [smŋŋoi] than the 'do not knows' did. However, the numbers are not large enough for this to be satisfactorily significant.

The results of the questionnaire revealed that not only users of VVN but also non-users of VVN use [sɯŋŋoi] and that, although the acceptance rate of [sɯggoi] by the user of VVN is much lower than that by the non-users of VVN, it is still one of the highest among the emphatic forms with gemination (see Table (7)). Therefore, my above assumption proved wrong and we should consider that /sɯgo+i/ → [sɯggoi] and /sɯgo+i/ → [sɯŋŋoi] are two separate processes; the former as gemination and the latter as prenalisation, just like /sabiʃi+i/ → [sabbiʃiː] 'lonely' and /hɯɾɯ+i/ → [ɸɯllɯi] 'old' (gemination) and /sabiʃi+i/ → [sambiʃiː] 'lonely' and /hɯɾɯ+i/ → [ɸɯnlɯi] 'old' (prenasalisation).

(21) Derivational theoretical analysis of emphasising /sɯgo+i/ 'terrific, terrible' (revised)

| i. Gemination | | ii. Prenasalisation | |
|---|---|---|---|
| | /sɯgo+i/ | | /sɯgo+i/ |
| gemination | sɯggoi | prenasalisation | sɯŋgoi |
| VVN | n/a | VVN | sɯŋŋoi |
| | [sɯggoi] | | [sɯŋŋoi] |

This actually explains why users of VVN use both [sɯggoi] and [sɯŋŋoi]. It is simply a matter of employing different measures to emphasise the word, and the fact that the emphatic form of /sɯgo+i/ with prenasalisation happens to be rated higher and accepted by more people than the others is assumed to be due to its frequent use as an emphasiser meaning 'extremely' in addition to its function as an adjective.

### 8.3.5 Summary

When one wishes to utter adjectives emphatically, there are several alternatives to choose from in doing so: vowel lengthening, gemination, prenasalisation, and a combination of any of these, including double occurrence of any one. The most commonly accepted way of emphasising adjectives is vowel lengthening, and the second mostly accepted way is gemination. The combination of these two methods is also widely accepted, but prenasalisation and any other combination do not seem to be considered as natural by many. The most preferred locus of vowel lengthening is the root-final position and that for gemination is the onset of the second syllable. The root-medial vowel or consonant is less likely to be lengthened or geminated. Furthermore, when there are two or more possible loci of gemination, there seems to be a slight tendency that less sonorous segments are more readily geminated than more sonorous ones. The following scales summarise the discussions so far:

(22) Scales relevant to emphatic forms of adjectives

i. Methods
vowel lengthening > gemination > gemination & vowel lengthening > prenasalisation > others

ii. Loci
   a. Vowel lengthening: root-final vowel > first vowel > others
   b. Gemination: onset of the second syllable > onset of the root-final syllable > others

iii. Segments
voiceless stop > voiceless fricative > voiced stop > liquid > glide > nasal

## 8.4 OPTIMALITY THEORETICAL ANALYSIS OF EMPHATIC FORMS

In the previous section we saw how Japanese speakers utter adjectives emphatically and how they perceive a variety of emphatic forms. Among all those emphatic forms, those with the lengthening of the root-final vowel (e.g. /sɯgo+i/ → [sɯŋo:i] 'terrific, terrible'), with the gemination of the onset of the second syllable (e.g. /sɯgo+i/ → [sɯggoi]) and with the combination of both (e.g. /sɯgo+i/ → [sɯggo:i]) are widely accepted (see 8.3.3), while the acceptance rates of most others are quite marginal and only a small number of subjects replied, 'I would/might say it.' I do not think it is important to account for all possible emphatic forms, especially those that are not considered as natural or acceptable by many. For this reason, I only focus on accounting for those that scored better than 4.0 and were accepted by more than one third of the subjects, namely, vowel lengthening, gemination and the combination of both, in this section.

### 8.4.1 Reranking of Constraints

Emphatic forms of adjectives always violate WT-IDENT-IO(Open) (see Chapter 6, 6.6) and often involve a violation of NOVOIGEM which is usually undominated in Japanese, except in Foreign vocabulary. Therefore, just like inverse CL (see Chapter 6, 6.6) and vulgarisms (see Chapter 7, 7.4), the process of emphasis by means of vowel lengthening and/or gemination lends itself to analysis in terms of constraint reranking.

One of the first things we must consider in order to account for the process of emphasis is how we differentiate adjectives (and adverbs) from the other parts of speech. A very small number of nouns and verbs can undergo prenasalisation in casual speech (e.g. /tabi/ → [tambi] 'time, occasion', /togaɾ+ɯ/ → [toŋŋaɾɯ] 'become pointed') but nouns and verbs never undergo vowel lengthening nor gemination in the same way as adjectives and adverbs do.[45] This may be due to the fact that we often have minimal pairs, such as [toɾi] 'bird' ~ [to:ɾi] 'street' and [hakeN] 'dispatch' ~ [hakkeN] 'discovery' among nouns and [oɯ] 'chase' ~ [o:ɯ] 'cover' and [sasɯɾɯ] 'rub' ~ [sassɯɾɯ] 'guess' among verbs, but none among adjectives and adverbs,[46] and if we allow nouns and verbs to be emphasised by means of vowel lengthening or gemination, it will certainly cause the listener a problem with word recognition. However, a more likely reason why the process of emphasis targets only modifying words (i.e. adjectives and adverbs) is that modifiers are typically gradable while nouns and verbs almost never are; in order words, modifiers are semantically more suitable for placing emphasis. In order to account for the process of emphasis, therefore, we need a category-specific constraint that has effects only on adjectives (and adverbs),[47] which I formulate as follows:[48]

(23) Constraint 55

**¬WT-IDENT-IO(Modifier)**: It is not the case that corresponding segments in a modifier agree in weight.

¬WT-IDENT-IO(Modifier) is another anti-faithfulness constraint (cf. ¬WT-IDENT-IO (Chapter 6, 6.6), ¬IDENT$_{FIN}$-IO[+back](Root) (Chapter 7, 7.4)), which requires at least one

[45] The only exception I can think of is /ɯso/ → [ɯsso:]. /ɯso/ is a noun meaning 'lie' but when it is uttered as [ɯsso:], it means 'I can't believe it' or 'you must be kidding!', rather than 'it's a lie'.

[46] The fact that minimal pairs are not allowed among adjectives and adverbs can be ascribed to facilitation of emphatic modification as well.

[47] Smith (1997) claims that nouns are cross-linguistically more salient than predicates and proposes noun faithfulness constraints. Japanese nouns also surface more faithfully to the underlying representation than predicates, but her noun faithfulness theory alone is not sufficient to account for the emphatic forms.

[48] Kawahara (2001) proposes GEMINATE and INTENSE to account for emphatic expressions but these constraints simply describe the process of emphasis and fail to explain why they target modifiers.

segment to surface unfaithfully. This constraint is dominated by WT-IDENT-IO(Open) in normal (i.e. non-emphatic) speech so that adjectives (and adverbs) surface faithfully to the underlying representation in terms of weight. However, when one wishes to utter adjectives (and adverbs) emphatically, it is promoted above WT-IDENT-IO(Open).[49] Let us see how these two constraints interact in non-emphatic speech and in emphatic speech in tableaux for /jasɯ+i/ 'cheap' (adj.) and /jasɯɾi/ 'rasp' (noun).

(24) Tableaux for /jasɯ+i/ 'cheap' and /jasɯɾi/ 'rasp'

i. In non-emphatic speech

| Input: | | WT-IDENT-IO(Open) | ¬WT-IDENT-IO(Modifier) |
|---|---|---|---|
| /jasɯ+i/ | a. ☞ jasɯi | | * |
| | b. jasɯ:i | *! | |
| | c. ja:sɯi | *! | |
| | d. jassɯi | *! | |
| | e. jassɯ:i | *!* | |
| /jasɯɾi/ | f. ☞ jasɯɾi | | |
| | g. jasɯ:ɾi | *! | |
| | h. ja:sɯɾi | *! | |
| | i. jassɯɾi | *! | |
| | j. jassɯ:ɾi | *!* | |

ii. In emphatic speech

| Input: | | ¬WT-IDENT-IO(Modifier) | WT-IDENT-IO(Open) |
|---|---|---|---|
| /jasɯ+i/ | a. jasɯi | *! | |
| | b. ☞ jasɯ:i | | * |
| | c. ☞ ja:sɯi | | * |
| | d. ☞ jassɯi | | * |
| | e. jassɯ:i | | **! |
| /jasɯɾi/ | f. ☞ jasɯɾi | | |
| | g. jasɯ:ɾi | | *! |
| | h. ja:sɯɾi | | *! |
| | i. jassɯɾi | | *! |
| | j. jassɯ:ɾi | | *!* |

[49] In other words, Japanese gramaticalises a semantic contrast by permitting constraint reranking for emphasis only with modifiers.

As clearly seen in the above tableaux, in non-emphatic speech the domination of ¬WT-IDENT-IO(Modifier) by WT-IDENT-IO(Open) makes sure that no segment is lengthened, whether the item is a modifier or not. In emphatic speech, on the other hand, ¬WT-IDENT-IO(Modifier) is upgraded above WT-IDENT-IO(Open) and it requires the weight of at least one segment in the output to be unfaithful to its input correspondent but only when the item belongs to modifiers.

In addition to ¬WT-IDENT-IO(Modifier), there are a few more constraints whose position in the constraint hierarchy needs to be altered. In normal speech, regardless of the formality of speech, NOVOIGEM is undominated and IDENT-IO(lateral) (Lee 2003) is high-ranking in Yamato vocabulary so the gemination of laterals, as well as glides, never takes place. However, as Amanuma et al. (1978:75) point out, the gemination of laterals is observed in emphatic speech, thus these two constraints must be demoted in this register of speech. Let us draw tableaux for /sɯɾɯdo+i/ 'sharp' before and after the reranking of ¬WT-IDENT-IO(Modifier), NOVOIGEM and IDENT-IO(lateral) to see how they interact with WT-IDENT-IO(Open)[50] (candidates with vowel lengthening are omitted).

(25) Tableaux for /sɯɾɯdo+i/ 'sharp'

i. Before reranking

| Input: /sɯɾɯdo+i/ | NOVOIGEM | IDENT-IO (lateral) | WT-IDENT-IO(Open) | ¬WT-IDENT-IO(Modifier) |
|---|---|---|---|---|
| a. ☞ sɯɾɯdoi | | | | * |
| b. sɯllɯdoi | *! | * | * | |
| c. sɯɾɯddoi | *! | | * | |

ii After reranking

| Input: /sɯɾɯdo+i/ | ¬WT-IDENT-IO(Modifier) | WT-IDENT-IO(Open) | NOVOIGEM | IDENT-IO (lateral) |
|---|---|---|---|---|
| a. sɯɾɯdoi | *! | | | |
| b. sɯllɯdoi | | * | * | *! |
| c. ☞ sɯɾɯddoi | | * | * | |

[50] Both NOVOIGEM and IDENT-IO(lateral) must be demoted below WT-IDENT-IO(Open), as well as a constraint that requires the gemination of the first consonant that can be geminated within a modifier (see (26) below), in order for such a candidate as [ɯlleʃi:] to beat [ɯreʃʃi:] for /ɯresi+i/ 'glad'.

Due to the demotion of NOVOIGEM below WT-IDENT-IO(Open) in conjunction with the promotion of ¬WT-IDENT-IO(Modifier) above WT-IDENT-IO(Open), voiced segments can now be geminated in the process of emphasis. In (25.ii) [sɯɾɯddoi], not [sɯllɯdoi], is selected as optimal because it does not violate IDENT-IO(lateral), which is now a low-ranking constraint. Although both [sɯllɯdoi] and [sɯɾɯddoi] can be heard in emphatic speech, the one that was rated higher and accepted more by the subjects was [sɯllɯdoi][51] so we need to account for the preference for [sɯllɯdoi] over [sɯɾɯddoi] as well.

### 8.4.2 Preference of the Locus of Gemination

According to my survey, emphatic forms with the gemination of the onset of the second syllable are perceived as much more natural and, thus, much more acceptable than emphatic forms with the gemination of any other onset, with the exception of those in which the onset of the second syllable is a nasal and the onset of the following syllable is a voiceless stop (e.g. /tɯmeta+i/ 'cold', /minikɯ+i/ 'ugly'[52]). Thus, there must be a constraint that prefers the gemination of the onset of the second syllable to that of other onsets. I assume **ALIGNGEM-L**:

(26) Constraint 56

**ALIGNGEM-L(Modifier)**: In a modifier the left edge of a geminate must coincide with the left edge of the leftmost consonant.[53, 54]

[51] The ratings/acceptance rates of [sɯllɯdoi] and [sɯɾɯddoi] were 3.6/45.2% and 4.4/19.4%, respectively.

[52] The ratings/acceptance rates of [minnikɯi] and [minikkɯi] were 4.3/19.4% and 4.0/29.0%, respectively, and those of [tsɯmmetai] and [tsɯmettai] were 3.8/35.5% and 3.8/38.7%, respectively. See (9.i).

[53] This is similar to a palatalisation rule in Japanese, which palatalises the leftmost consonant within a base of a mimetic word unless there is a coronal consonant to its right (e.g. /poko+RED/ → [pokopoko] 'moving up and down', [pʲokopʲoko] 'jumping around imprudently'; /pota+RED/ → [potapota] 'dripping', [potʃapotʃa] 'dripping in large quantities'). See Hamano (1986), Mester & Itô (1989) and Tsujimura (1996) for further discussion on this.

[54] ALIGNGEM-L(Modifier) prefers a candidate with the gemination of a root-medial consonant (e.g. [mɯdzɯkkaʃi:] 'difficult') to a candidate with the gemination of the consonant in the root-final syllable (e.g. [mɯdzɯkaʃʃi:] 'difficult'), which is contradictory to the conclusion we have reached in the previous section. However, out of 39 trisyllabic- and quadrisyllabic-root adjectives in the questionnaire, there are only four whose emphatic form with the gemination of the onset of the root-final syllable scored better than 4.0 or accepted by more than one third of the subjects (i.e. [sikakkɯi] 'square' (3.6/36.7%), [tsɯmettai] 'cold' (3.8/38.7%), [kɯjaʃʃi:] 'vexed' (3.8/38.7%) and [ijaraʃʃi:] 'indecent' (3.9/35.5%)). Thus, I do not think it is necessary to account for the preference for the gemination of the onset of the root-final syllable over that of the root-medial syllable.

Gemination of an initial consonant of a morpheme is completely banned in Japanese due to high-ranking *COMPLEX so that 'the leftmost consonant' virtually means the onset of the second syllable. If we rank this constraint above NOVOIGEM and IDENT-IO(lateral), we should be able to select a candidate with the gemination of the onset of the second syllable as optimal. Here is a revised tableau of (25.ii).

(27) Tableau for /sɯɾɯdo+i/ 'sharp' (revised)

| Input: /sɯɾɯdo+i/ | ¬WT-ID (Modifier) | *COMPLEX | WT-ID (Open) | ALIGNGEM-L(Modifier) | NOVOI GEM | IDENT (lateral) |
|---|---|---|---|---|---|---|
| a. sɯɾɯdoi | *! | | | | | |
| b. ☞ sɯllɯdoi | | | * | * | * | * |
| c. sɯɾɯddoi | | | * | **! | * | |
| d. ssɯɾɯdoi | | * | *! | | | |

This ranking also correctly selects optimal candidates for emphatic forms of adjectives with a voiced segment in the onset of the second syllable, as seen in the following (candidates with vowel lengthening and/or the gemination of the initial consonant are omitted):

(28) Tableaux for /kɯjasi+i/ 'vexed' and /mɯzɯkasi+i/ 'difficult'

| Input: /kɯjasi+i/ | ¬WT-IDENT-IO(Modifier) | WT-IDENT-IO(Open) | ALIGNGEM-L(Modifier) | NOVOIGEM |
|---|---|---|---|---|
| a. kɯjaʃi: | *! | | | |
| b. ☞ kɯjjaʃi: | | * | * | * |
| c. kɯjaʃʃi: | | * | **! | |

| Input: /mɯzɯkasi+i/ | ¬WT-IDENT-IO(Modifier) | WT-IDENT-IO(Open) | ALIGNGEM-L(Modifier) | NOVOIGEM |
|---|---|---|---|---|
| d. mɯdzɯkaʃi: | *! | | | |
| e ☞ mɯddzɯkaʃi: | | * | * | * |
| f. mɯdzɯkkaʃi: | | * | **! | |
| g. mɯdzɯkaʃʃi: | | * | **!* | |

8.4.3 Vowel Lengthening Versus Gemination

Let us return to Tableau (24.ii), in which three candidates are selected as optimal for /jasɯ+i/ 'cheap': [jasɯ:i] (24.ii.b), [ja:sɯi] (24.ii.c) and [jassɯi] (24.ii.d). While the ratings and acceptance rates vary, none of these emphatic forms, as well as [jassɯ:i] (26.ii.e), is completely rejected, but the problem with the current constraint ranking is that it cannot differentiate one from another in terms of naturalness. As discussed in the previous section, vowel lengthening is preferred to gemination (e.g. [jasɯ:i] > [jassɯi]) and the lengthening of the root-final vowel is far more widely accepted than that of the first vowel (e.g. [jasɯ:i] > [ja:sɯi]). These facts need to be incorporated into our OT analysis, but how should we go about it?

Let us start with vowel lengthening vs. gemination. In order for an emphatic form with vowel lengthening to be preferred to that with gemination, all we need to do is to rank ALIGNGEM-L(Modifier) and WT-IDENT-IO in the same stratum, as seen in the following tableau for /jasɯ+i/ 'cheap' (*COMPLEX and candidates that violate this constraint are omitted):

(29) Tableau for /jasɯ+i/ 'cheap'

| Input: /jasɯ+i/ | ¬WT-IDENT-IO(Modifier) | WT-IDENT-IO(Open) | ALIGNGEM-L(Modifier) | WT-IDENT-IO |
|---|---|---|---|---|
| a. jasɯi | *! | | | |
| b. ☞ jasɯ:i | | * | | * |
| c. ☞ ja:sɯi | | * | | * |
| d. jassɯi | | * | * | *! |
| e. jassɯ:i | | **! | * | |

In this tableau two candidates with a different locus of vowel lengthening are selected as optimal. In order to differentiate the candidate with the lengthening of the root-final vowel from the candidate with the lengthening of the first vowel or any other vowel, we need to subdivide WT-IDENT-IO into several constraints with further specification.[55] I propose the following four constraints:

[55] In Japanese, /ei/, /oɯ/ and a sequence of two identical vowels surface as long vowels (see Chapter 7) so we cannot adopt **NO-LONG-V** (Prince & Smolensky 1993) in our analysis. We cannot employ ALIGNMENT constraints either because a long vowel can occur anywhere within a word. Also, if we rank ALIGN-LONG-V-R above ALIGN-LONG-V-L, [ki:tanai], for instance, will be eliminated before [kita:nai] for /kitana+i/ 'dirty' in spite of the fact that the former is much more acceptable than the latter.

(30) Constraints 57[56]

a. **WT-IDENT-V$_{INIT}$-IO**: No lengthening or shortening of a vowel of a morpheme-initial syllable.

b. **WT-IDENT-V$_{MID}$-IO**: No lengthening or shortening of a vowel of a morpheme-medial syllable.

c. **WT-IDENT-V$_{FIN}$-IO**: No lengthening or shortening of a vowel of a morpheme-final syllable.

d. **WT-IDENT-IO[+cons]**: No lengthening or shortening of a consonant.

The root-final vowel and a root-medial vowel are the most preferred and the least preferred segment to be lengthened, respectively, so the first three WT-IDENT-V-IO constraints need to be ranked in the following order:

(31) Constraint ranking 27

WT-IDENT-V$_{MID}$-IO >> WT-IDENT-V$_{INIT}$-IO >> WT-IDENT-V$_{FIN}$-IO

In regard to the position of ALIGNGEM-L(Modifier) and WT-IDENT-IO[+cons], I assume that both constraints are ranked together with WT-IDENT-V$_{FIN}$-IO. Let us redraw a tableau for /sɯɾɯdo+i/ 'sharp' to see which candidate our newly established constraint ranking opts for (*COMPLEX, NOVOIGEM and IDENT-IO(lateral) are omitted).

(32) Tableau for /sɯɾɯdo+i/ 'sharp' (further revised)

| Input: /sɯɾɯdo+i/ | ¬WT-ID (Mod) | WT-ID (Open) | WT-ID V$_{MID}$ | WT-ID V$_{INIT}$ | ALIGNGEM -L(Mod) | WT-ID [+cons] | WT-ID V$_{FIN}$ |
|---|---|---|---|---|---|---|---|
| a. sɯɾɯdoi | *! | | | | | | |
| b. ☞ sɯɾɯdo:i | | * | | | | | * |
| c. sɯ:ɾɯdoi | | * | | *! | | | |
| d. sɯɾɯ:doi | | * | *! | | | | |
| e. sɯllɯdoi | | * | | | * | *! | |
| f. sɯɾɯddoi | | * | | | **! | * | |
| g. sɯllɯdo:i | | *!* | | | * | * | * |

[56] We will need one more WEIGHT-IDENTITY constraint to militate against the lengthening of the word-final segment, so that the tense morpheme /i/ will never be lengthened and /totemo/ 'very' (1.i.a), for instance, will not surface as *[totemo:]. This constraint must dominate WT-IDENT-IO[+cons] so that the preferred method of emphasising adverbs is gemination, not vowel lengthening, as seen in (1.i). See 8.6.2 for further discussion on this.

In the survey the emphatic forms of /sɯɾɯdo+i/ 'sharp' were rated in the following order:

(33) Emphatic forms of /sɯɾɯdo+i/ 'sharp' in order of rating and acceptance rate[57]

sɯɾɯdo:i (2.5, 74.2%) > sɯllɯdo:i (3.5, 54.8%) > sɯllɯdoi (3.6, 45.2%) > sɯ:ɾɯdoi (4.1, 25.8%) > sɯɾɯddoi (4.4, 19.4%) > sɯɾɯ:doi (4.7, 9.7%)

Tableau (32) more or less reflects the results of the survey accurately; the less acceptable the form is, the sooner it is eliminated, with the exception of the form with both vowel lengthening and gemination. How, then, can we allow a form with both to remain in the competition at least until the lower-rated forms are all eliminated?

8.4.4 Vowel Lengthening and Gemination

As a native Japanese speaker, I perceive an emphatic form with both vowel lengthening and gemination (e.g. /sɯgo+i/ → [sɯggo:i] 'terrific, terrible') as more emphatic than a form with only one of the two (e.g. [sɯŋo:i], [sɯggoi]), and in the survey the form with both is accepted as much as the form with gemination alone (see Table (16)). In our OT analysis, however, such a form as [sɯggo:i] is the first to be eliminated among a variety of emphatic forms due to multiple violations of WT-IDENT-IO(Open) (see Tableau (32)). What we need in order to keep the emphatic form with both a little longer in the competition is a constraint ranked in the same stratum as WT-IDENT-IO(Open), which any emphatic form with only one additional mora violates more seriously so that the emphatic form with both vowel lengthening and gemination will not be eliminated in that stratum. I propose the following constraint:

(34) Constraint 58

**MAXIMISE-μ(Modifier)**: Maximise the number of moras in a modifier.[58]

[57] Emphatic forms of most other adjectives were rated in a very similar way as those of /sɯɾɯdo+i/ 'sharp'.

[58] As seen in (1), adverbs can undergo gemination or vowel lengthening but, under ordinary circumstances, an emphatic form with both gemination and vowel lengthening is not observed (e.g. /totemo/ → [tottemo]/ *[to:ttemo]/*[totte:mo]/*[tottemo:] 'very'). This is because any candidate with more than one extra mora will be eliminated before ALIGNGEM-L(Modifier) and/or WT-IDENT-IO[+cons] eliminates, for instance, [tottemo]. See 8.6.2 for the reason why *[tottemo:] cannot be optimal.

Although MAXIMISE-μ(Modifier) requires a modifier to have a maximal number or moras (i.e. the number of the underlying segments multiplied by two), every additional mora incurs a violation of WT-IDENT-IO(Open), which is ranked in the same stratum as MAXIMISE-μ(Modifier), so that any candidate with more than one extra mora will be eliminated by one of the WEIGHT-IDENTITY constraints, as the following final tableau for /sɯɾɯdo+i/ 'sharp' shows (a few more candidates are added):

(35) Tableau for /sɯɾɯdo+i/ 'sharp' (final)

| Input: /sɯɾɯdo+i/ | ¬WT (Mod) | MAXIMISE -μ(Mod) | WT (Op) | WT-$V_{MID}$ | WT-$V_{INIT}$ | ALIGNG -L(Mod) | WT-ID [+cons] | WT-$V_{FIN}$ |
|---|---|---|---|---|---|---|---|---|
| a. sɯɾɯdoi | *! | ****** | | | | | | |
| b. ☞ sɯɾɯdo:i | | ***** | * | | | | | * |
| c. sɯ:ɾɯdoi | | ***** | * | | *! | | | |
| d. sɯɾɯ:doi | | ***** | * | *! | | | | |
| e. sɯllɯdoi | | ***** | * | | | * | *! | |
| f. sɯɾɯddoi | | ***** | * | | | **! | * | |
| g. sɯllɯdo:i | | **** | ** | | | * | *! | * |
| h. sɯllɯddoi | | **** | ** | | | **!* | ** | |
| i. sɯ:ɾɯ:doi | | **** | ** | *! | * | | | |
| j. sɯ:llɯ:ddo:i | | * | ***** | *! | * | *** | ** | * |

In this tableau, the candidate with the lengthening of the root-final vowel is still selected as optimal because it is the one that is the most widely accepted emphatic form of /sɯɾɯdo+i/ 'sharp', but at least the candidate with both vowel lengthening and gemination (35g) remains in the contention until it reaches the stratum in which the selection of the optimal candidate is complete.[59]

### 8.4.5 Prohibition Against Trimoraic Syllables in Modifiers

As we saw in 8.3.2.1, [okki:] and [tʃissai] are by far the most widely accepted and highly rated emphatic forms of /ooki+i/ 'big' and /tiisa+i/ 'small', respectively.[60] If MAXIMISE-μ

[59] As a candidate for /sɯɾɯdo+i/ 'sharp', [ssɯ:llɯ:ddo:i] has the maximal number of moras but it will be eliminated before reaching WT-IDENT-$V_{MID}$-IO due to a violation of *COMPLEX (see Tableau (27)).
[60] With the exception of [tʃittʃai], a palatalised version of [tʃissai], which sounds a little childish.

(Modifier) requires an emphatic form to have as many moras as possible, then [o:kki:] and [tʃi:ssai] should be more favoured than [okki:] and [tʃissai], as seen in the following tableaux:

(36) Tableaux for /ooki+i/ 'big' and /tiisa+i/ 'small'[61]

| Input: /$o_1o_2$ki+i/ | ¬WT (Mod) | MAXIMISE -μ(Mod) | MAX (Op) | WT (Op) | WT-$V_{MID}$ | WT-$V_{INIT}$ | ALIGNG -L(MOD) | WT-$V_{FIN}$ |
|---|---|---|---|---|---|---|---|---|
| a. $o_{12}$:ki: | *! | * | | | | | | |
| b. $o_{12}$kki: | | * | | *!* | | * | | |
| c. $o_1$kki: | | * | *! | * | | | | |
| d. ☞ $o_{12}$:kki: | | | | * | | | | |
| e. $o_{12}$:kki:i | | | | **! | | | | * |
| f. $o_1$:$o_2$:kki:i | | | | **!** | * | * | | * |

| Input: /t$i_1i_2$sa+i/ | ¬WT (Mod) | MAXIMISE -μ(Mod) | MAX (Op) | WT (Op) | WT-$V_{MID}$ | WT-$V_{INIT}$ | ALIGNG -L(MOD) | WT-$V_{FIN}$ |
|---|---|---|---|---|---|---|---|---|
| g. tʃ$i_{12}$:sai | *! | *** | | | | | | |
| h. tʃ$i_{12}$ssai | | *** | | *!* | | * | * | |
| i. tʃ$i_1$ssai | | *** | *! | * | | | * | |
| j. ☞ tʃ$i_{12}$:ssai | | ** | | * | | | * | |
| k. tʃ$i_{12}$:ssa:i | | * | | ** | | | * | *! |
| l. tʃ$i_1$:$i_2$:ssa:i | | * | | ***!* | * | * | * | * |

Why, then, do the speakers of Japanese consider [okki:] and [tʃissai] as far more natural than [o:kki:] and [tʃi:ssai], respectively?

In Japanese there is a constraint called *3μ that militates against trimoraic syllables (see Chapter 6, 6.5), but it is not undominated in Yamato vocabulary because we do have such words as [to:tte] 'passing' and [todoko:tta] 'stagnated'. Therefore, in order for [to:tte] to beat [totte], *3μ must be ranked below MAX-IO(Open) and WT-IDENT-IO(Open), as the following tableau for /toor+te/ 'passing' shows:

[61] Any candidate with only one of the two consecutive identical vowels (e.g. [$o_1$kki:] (36c), [tʃ$i_1$ssai] (36i)) also violates MAX-IO(Root), which is ranked lower than MAX-IO(Open). The ranking of MAX-IO(Root), in relation to WT-IDENT-IO constraints proposed in this chapter, has not been established yet but, because the addition of this constraint to Tableaux (36) does not affect the selection of optimal candidates, MAX-IO(Root) is omitted. It will be added in Tableaux (39) to show that it is [$o_{12}$kki:] (36b) and [tʃ$i_{12}$ssai] (36h), not [$o_1$kki:] (36c) and [tʃ$i_1$ssai] (36i), that will become optimal for /ooki+i/ and /tiisa+i/, respectively.

(37) Tableau for /tooɾ+te/ 'passing'[62]

| Input: /$to_1o_2$ɾ+te/ | OCP | MAX (Op) | MAX $_{\text{INIT}}$-C | IDENT (back) | WT (Op) | IDENT (height)(Op) | ONS | *3μ | UNIF |
|---|---|---|---|---|---|---|---|---|---|
| a. ☞ $to_{12}$:tte | | | | | | | | * | * |
| b. toɯtte | | | | | | * | *! | | |
| c. toatte | | | | | | * | *! | | |
| d. $to_{12}$tte | | | | | *! | | | | * |
| e. toette | | | | *! | | | * | | |
| f. $to_{12}$:ɾe | | | *! | | | | | | * |
| g. $to_{12}$:te | | *! | | | | | | | * |
| h. $to_1$tte | | *! | | | | | | | |
| i. tootte | *! | | | | | | * | | |

However, if MAX-IO(Open) and WT-IDENT-IO(Open) dominate *3μ, then there will be no chance that [okki:] (either (36b) or (36c)) and [tʃissai] (either (36h) or (36i)) can beat [o:kki:] (36d) and [tʃi:ssai] (36j), respectively, as the former are eliminated before the latter reach *3μ. Nevertheless, the preference for the former over the latter has to be ascribed to some kind of constraint that prohibits trimoraic syllables because the only constraint that (36d) and (36j) violate but (36b) and (36h) do not is *3μ. I thus propose a constraint that militates against trimoraic syllables in modifiers.[63]

(38) Constraint 59

***3μ(Modifier)**: Trimoraic syllables are disallowed in modifiers.

If this constraint is ranked in the same stratum as MAX-IO(Open) and WT-IDENT-IO(Open), [o:kki:] and [tʃi:ssai] can still beat [okki:] and [tʃissai], respectively (see Tableaux (36)), so that it must be placed higher than MAX-IO(Open) and WT-IDENT-IO(Open) but, as we do find such emphatic forms of adverbs as [dze:ndzeN] 'not at all' and [ho:nto] 'really, truly' (see (1.i)),[64] it cannot be undominated. Therefore, I rank it in the same stratum as

[62] (37e) and (37f) can be eliminated by DEP-IO[-back] (second stratum) MAX-IO[+obs][cor] (undominated), respectively, as well.

[63] Upranking *3μ to the same stratum as or above MAX-IO(Open) and WT-IDENT-IO(Open) will cause havoc elsewhere, as is the case with /tooɾ+te/ 'passing', thus it is not an option.

[64] In both cases, the violation of *3μ(Modifier) involves a moraic nasal, so a violation of this constraint by a long vowel and a moraic nasal appears to be more tolerable than that by a long vowel followed by a geminate.

¬WT-IDENT-IO(Modifier). Here are revised tableaux for /ooki+i/ 'big' and /tiisa+i/ 'small' (some low-ranking constraints are omitted).

(39) Tableaux for /ooki+i/ 'big' and /tiisa+i/ 'small' (revised)[65]

| Input: /$o_1o_2$ki+i/ | ¬WT (Mod) | *3μ (Mod) | MAXIMISE -μ(Mod) | MAX (Op) | WT (Op) | MAX (Root) | WT-$V_{INIT}$ | WT-ID [+cons] |
|---|---|---|---|---|---|---|---|---|
| a. $o_{12}$:ki: | *! | | * | | | | | |
| b. ☞ $o_{12}$kki: | | | * | | ** | | * | * |
| c. $o_1$kki: | | | * | * | * | *! | | * |
| d. $o_{12}$:kki: | | *! | | | * | | | * |
| e. $o_{12}$:kki:i | | *! | | | ** | | | * |
| f. $o_1$:$o_2$:kki:i | | *! | | | **** | | * | * |

| Input: /t$i_1i_2$sa+i/ | ¬WT (Mod) | *3μ (Mod) | MAXIMISE -μ(Mod) | MAX (Op) | WT (Op) | MAX (Root) | WT-$V_{INIT}$ | WT-ID [+cons] |
|---|---|---|---|---|---|---|---|---|
| g. tʃ$i_{12}$:sai | *! | | *** | | | | | |
| h. ☞ tʃ$i_{12}$ssai | | | *** | | ** | | * | * |
| i. tʃ$i_1$ssai | | | *** | * | * | *! | | * |
| j. tʃ$i_{12}$:ssai | | *! | ** | | * | | | * |
| k. tʃ$i_{12}$:ssa:i | | *! | * | | ** | | | * |
| l. tʃ$i_1$:$i_2$:ssa:i | | *! | * | | **** | | * | * |

Earlier in this section we subdivided WT-IDENT-IO into four: WT-IDENT-IO[+cons], WT-IDENT-$V_{INIT}$-IO, WT-IDENT-$V_{MID}$-IO and WT-IDENT-$V_{FIN}$-IO. In Chapter 6 we ranked WT-IDENT-IO in the same stratum as MAX-C-IO, which is ranked two strata lower than MAX-IO (Root), thus we should consider MAX-IO(Root) >> WT-IDENT-$V_{INIT}$-IO. When we add *3μ (Modifier) and MAX-IO(Root) to Tableaux (36), it becomes obvious that (i) any candidate with a *3μ(Modifier) violation is eliminated at quite an early stage of the selection process, which implies that its acceptance rate should be low,[66] and (ii) it is the candidates with vowel coalescence (i.e. (39b) and (39h)), not the candidates with vowel deletion (i.e. (39c) and (39i)), that are optimal for /ooki+i/ 'big' and /tiisa+i/ 'small' in emphatic speech.

[65] These tableaux are drawn based on the assumption that /ooki+i/ → [okki:] 'big' and /tiisa+i/ → [tʃissai] 'small' are due to the process of emphasis. Even if we assume that these involve inverse CL instead of emphasis, we can still obtain [$o_{12}$kki:] (39b) and [tʃ$i_{12}$ssai] (39h) as optimal because [$o_1$kki:] (39c) and [tʃ$i_1$ssai] (39i) violate undominated NO-PARSE-μ(DelSeg).

[66] The acceptance rate of [o:kki:] and [tʃi:ssai] are 12.9% and 16.1%, respectively

In 8.3.2.4 we discussed the emphatic forms with an underlying geminate. In the survey the subjects were also asked to rate emphatic forms in which the vowel directly preceding the geminate is lengthened (e.g. /mottaina+i/ → [mo:ttainai] 'wasteful', /wasɯɾe+ppo+i/ → [wasɯɾe:ppoi] 'forgetful'). The ratings and acceptance rates of five such forms ranged from 3.6 to 4.5 (mean: 4.1) and from 41.9% to 16.1% (mean: 25.8%), respectively, which were higher than those of [o:kki:] and [tʃi:ssai], but we should still consider that on the whole these forms were also regarded as unnatural by the subjects due to *3μ(Modifier).

## 8.5 ALLOWING MULTIPLE OPTIMAL CANDIDATES

The most acceptable method of emphasising adjectives is to lengthen the root-final vowel and our current constraint ranking can rightly predict that a candidate with the final vowel being lengthened should be the actual output. However, the gemination of the onset of the second syllable and the combination of both methods are also frequently observed. How can we allow more than one candidate to be selected as optimal for a given adjective?

One way to achieve this end is to replace WT-IDENT-IO[+cons] with context-free WT-IDENT-IO. As we saw in Tableau (32), the choice between a candidate with vowel lengthening and a candidate with gemination is determined by WT-IDENT-IO[+cons]. Both candidates equally violate WT-IDENT-IO so that they should be selected as optimal, whether WT-IDENT-IO is ranked in the same stratum as ALIGNGEM-L(Modifier) and WT-IDENT-$V_{FIN}$-IO or lower than them, as seen in the following tableau for /jasɯ+i/ 'cheap':

(40) Tableau for /jasɯ+i/ 'cheap' (revised)

| Input: /jasɯ+i/ | ¬WT (Mod) | *3μ (Mod) | MAXIMISE -μ(Mod) | WT (Op) | WT -$V_{INIT}$ | ALIGNG -L(Mod) | WT -$V_{FIN}$ | WT -ID |
|---|---|---|---|---|---|---|---|---|
| a. jasɯi | *! | | **** | | | | | |
| b. ☞ jasɯ:i | | | *** | * | | | * | * |
| c. ja:sɯi | | | *** | * | *! | | | * |
| d. ☞ jassɯi | | | *** | * | | * | | * |
| e. jassɯ:i | | | ** | ** | | * | * | *!* |
| f. ja:ssɯ:i | | *! | * | *** | * | * | * | *** |

However, this cannot allow a form with both vowel lengthening and gemination, such as [jassɯ:i] (40e), to be selected as one of the optimal candidates for a given adjective in its emphatic form, because no matter how we rank ALIGNGEM-L(Modifier), WT-IDENT-$V_{FIN}$-IO and WT-IDENT-IO in relation to each other, we will never be able to obtain such a form due to its violations of both ALIGNGEM-L(Modifier) and WT-IDENT-$V_{FIN}$-IO as well as its multiple violations of WT-IDENT-IO. Therefore, we must abandon the idea of replacing WT-IDENT-IO[+cons] with context-free WT-IDENT-IO.

In order for a candidate with both vowel lengthening and gemination to become optimal, we need a constraint which a form with either vowel lengthening or gemination violates more seriously than a form with both. I thus propose a context-free version of MAXIMISE-μ(Modifier).

(41) Constraint 60

**MAXIMISE-μ:** Maximise the number of moras.

It seems plausible to assume such a constraint as this, as we are dealing with a register of speech in which emphasis is made by increasing the number of moras within a word.[67] Let us assume that this constraint is ranked in the same stratum as ALIGNGEM-L(Modifier), WT-IDENT-$V_{FIN}$-IO and WT-IDENT-IO[+cons] and see how it affects the selection of the optimal candidate in a further revised tableau for /jasɯ+i/ 'cheap'.[68]

[67] The addition of MAXIMISE-μ to our constraint hierarchy will not cause havoc elsewhere even when a candidate with gemination and/or final vowel lengthening for any closed-class item (e.g. /itadak+ɯ/ 'receive the favour of –ing (from a superior)') gets through to reach MAXIMISE-μ, if we assume that context-free WT-IDENT-IO is ranked somewhere below WT-IDENT-IO[+cons] and WT-IDENT-$V_{FIN}$-IO.

| Input: /itadak+ɯ/ | MAXIMISE-μ | WT-IDENT-IO[+cons] | WT-IDENT-$V_{FIN}$-IO | WT-IDENT-IO |
|---|---|---|---|---|
| a. ☞ itadakɯ | ******* | | | |
| b. itada:kɯ | ****** | | * | *! |
| c. ittadakɯ | ****** | * | | *! |
| d. ittada:kɯ | ***** | * | * | *!* |

As for open-class items, any candidate with an additional mora will be eliminated by high-ranking WT-IDENT-IO(Open).

[68] *3μ(Modifier) and any candidate that violates this constraint are omitted from the tableau.

(42) Tableau for /jasɯ+i/ 'cheap' (further revised)

| Input: /jasɯ+i/ | ¬WT (Mod) | MAXIMISE-μ (Modifier) | WT (Op) | WT-$V_{INIT}$ | ALIGNG -L(Mod) | MAXI-MISE-μ | WT [+cons] | WT-$V_{FIN}$ |
|---|---|---|---|---|---|---|---|---|
| a. jasɯi | *! | **** | | | | ***** | | |
| b. ☞ jasɯ:i | | *** | * | | | **** | | * |
| c. ja:sɯi | | *** | * | *! | | **** | | |
| d. jassɯi | | *** | * | | * | **** | *! | |
| e. jassɯ:i | | ** | ** | | * | *** | * | *! |

This time, the candidate with gemination (42d) and the candidate with both gemination and vowel lengthening (42e) fare equally but the candidate with vowel lengthening alone (42b) still beats them due to an ALIGNGEM-L(Modifier) violation incurred by (42d) and (42e). How, then, can we obtain such candidates as (42d) and (42e) as optimal?

In Chapter 6, 6.7, we adopted Anttila's 'partially ordered grammar' theory to explain why forms with CL and without CL co-exist in casual speech. Let us employ this theory again to see if it works for emphatic forms as well. When four constraints are involved in the partially ordered grammar, there are 4 × 3 × 2 × 1 = 24 ways to rank them. When either ALIGNGEM-L(Modifier) or WT-IDENT-IO[+cons] dominates the other three constraints, regardless of how the rest are ranked (12 out of 24 rankings), the candidate with vowel lengthening will become optimal, as seen in the following tableaux:

(43) Tableaux for /jasɯ+i/ 'cheap' 1

a. ALIGNGEM-L(Modifier) dominates the other three constraints

| Input: /jasɯ+i/ | ALIGNGEM-L(Modifier) | MAXIMISE -μ | WT-IDENT-IO [+cons] | WT-IDENT $V_{FIN}$-IO |
|---|---|---|---|---|
| a. ☞ jasɯ:i | | **** | | * |
| b. jassɯi | *! | **** | *! | |
| c. jassɯ:i | *! | *** | * | *! |

b. WT-IDENT-IO[+cons] dominates the other three constraints

| Input: /jasɯ+i/ | WT-IDENT-IO [+cons] | ALIGNGEM-L(Modifier) | MAXIMISE -μ | WT-IDENT $V_{FIN}$-IO |
|---|---|---|---|---|
| a. ☞ jasɯ:i | | | **** | * |
| b. jassɯi | *! | * | **** | |
| c. jassɯ:i | *! | * | *** | *! |

On the other hand, when WT-IDENT-$V_{INIT}$-IO dominates the other three constraints (6 out of 24 rankings), the candidate with gemination will be selected as optimal (see (44a)), and when MAXIMISE-μ dominates the other three constraints (6 out of 24 rankings), the candidate with both gemination and vowel lengthening will be selected as optimal (see (44b)).

(44) Tableaux for /jasɯ+i/ 'cheap' 2

a. WT-IDENT-$V_{INIT}$-IO dominates the other three constraints

| Input: /jasɯ+i/ | WT-IDENT $V_{FIN}$-IO | ALIGNGEM-L(Modifier) | MAXIMISE -μ | WT-IDENT-IO [+cons] |
|---|---|---|---|---|
| a. jasɯ:i | *! | | **** | |
| b. ☞ jassɯi | | * | **** | * |
| c. jassɯ:i | *! | * | *** | * |

b. MAXIMISE-μ dominates the other three constraints

| Input: /jasɯ+i/ | MAXIMISE -μ | ALIGNGEM-L(Modifier) | WT-IDENT-IO [+cons] | WT-IDENT $V_{FIN}$-IO |
|---|---|---|---|---|
| a. jasɯ:i | ****! | | | * |
| b. jassɯi | ****! | * | * | |
| c. ☞ jassɯ:i | *** | * | * | *! |

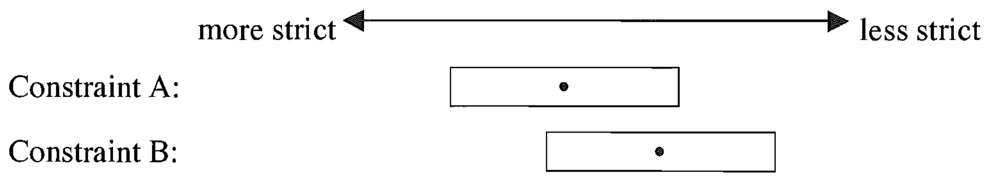
This indicates that, as the output of /jasɯ+i/ 'cheap', [jasɯ:i] should occur twice as often as both [jassɯi] and [jassɯ:i]. According to my survey, forms with vowel lengthening are more favoured than forms with gemination and forms with both gemination and vowel lengthening, and the latter two are almost equally accepted.[69] Therefore, the analysis by means of Anttila's 'partially ordered grammar' is supported by the results of the survey to some extent. However, as mentioned in 8.4.4, I perceive an emphatic form with both gemination and vowel lengthening as more emphatic than the other two, thus I assume that at least MAXIMISE-μ is upgraded to dominate the other three constraints only when the speaker wishes to emphasise a word further. In other words, the speaker chooses to utter the form with both emphasising methods by intentionally promoting MAXIMISE-μ above the others. 'Partially ordered grammar' is purely based on the factorial typology of the

[69] The average acceptance rates of forms with vowel lengthening, forms with gemination and forms with both are 2.2, 3.2 and 3.3, respectively. See (16).

constraints ranked in the same stratum and the probability of occurrence of each candidate, and it does not take into consideration the speaker's intentional reranking of constraints. This intentional constraint reranking by the speaker is beyond the limitations of 'partially ordered grammar', so we should seek an alternative theory to account for the choice among the three emphatic forms.

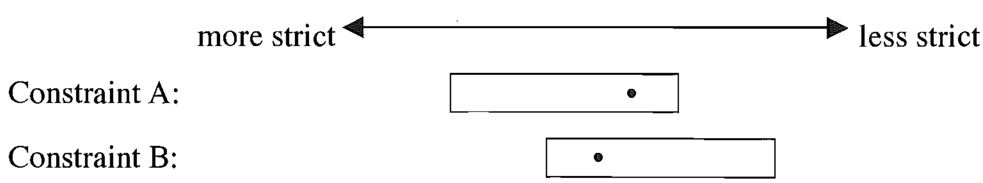
The theory I adopt in this thesis is that of Hayes (2000). In his 'gradient well-formedness' theory, each constraint takes on a range of values on an abstract continuum,[70] rather than being ranked in strict domination order, and possesses a strictness band, as seen in the following:

(45) Gradient well-formedness 1 (Hayes 2000:90)




As long as the strictness bands of two constraints overlap, both rankings of the two constraints will be available for the generation of the outputs. When the selection point (indicated with a dot) within Constraint A's strictness band is more strict than that within Constraint B's on a particular occasion, as seen in (45), the optimal candidate will be selected in a way that the ranking of Constraint A above Constraint B is respected. When Constraint A's selection point is less strict than that of Constraint B's on another occasion, as seen in (46), then the selection of the optimal candidate will be made according to the ranking of Constraint B above Constraint A.

(46) Gradient well-formedness 2 (ibid.)

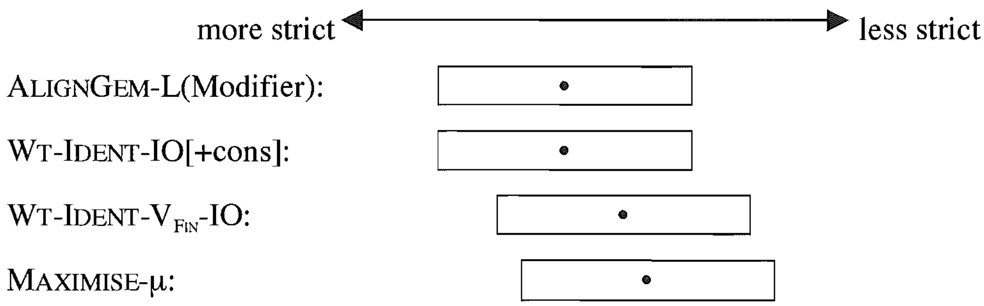



Let us apply this theory to our case at hand. In the process of emphasis, the method that is the most widely accepted is vowel lengthening so that it is assumed that the strictness band

[70] See also Boersma (2000) for this concept.

of ALIGNGEM-L(Modifier) and that of WT-IDENT-IO[+cons] are placed on the 'more strict' side of those of MAXIMISE-μ and WT-IDENT-V$_{FIN}$-IO. As for the ranking of the other two, emphasis by means of gemination alone is favoured slightly more than by means of the combination of vowel lengthening and gemination, thus we should assume that the strictness band of WT-IDENT-V$_{FIN}$-IO is slightly on the 'more strict' side of that of MAXIMISE-μ. The crucial point of our analysis is that the strictness bands of these four constraints overlap with each other to some extent.

(47) Relationship of four constraints 1




When the selection points of each constraint are as depicted in (47), ALIGNGEM-L (Modifier) and WT-IDENT-IO[+cons] dominate the other two and the candidate with vowel lengthening will become optimal, regardless of the ranking between the other two.[71]

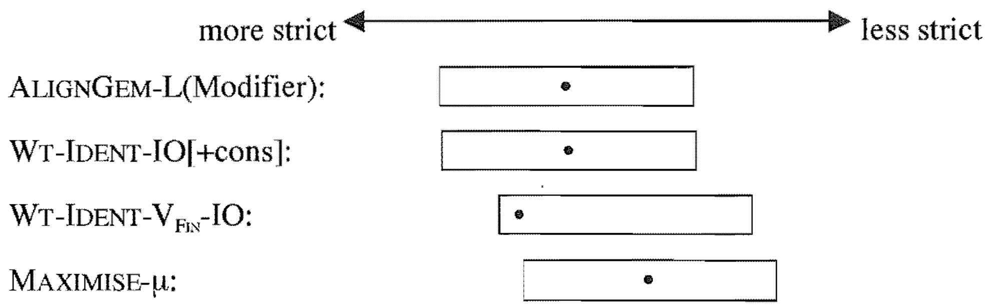
(48) Tableau for /jasɯ+i/ 'cheap' 3

| Input: /jasɯ+i/ | ALIGNGEM-L(Modifier) | WT-IDENT-IO [+cons] | WT-IDENT-V$_{FIN}$-IO | MAXIMISE -μ |
|---|---|---|---|---|
| a. ☞ jasɯːi | | | * | **** |
| b. jassɯi | *! | * | | **** |
| c. jassɯːi | *! | * | * | *** |

On some occasions, the selection point of WT-IDENT-V$_{FIN}$-IO may move towards the left edge of its strictness band. In this case, the candidates with vowel lengthening will be eliminated by this constraint and the one with gemination alone will be selected as optimal.

[71] A number of adjectives lack the initial onset (e.g. /itai+i/ 'sore, painful', /akaɾɯ+i/ 'bright, light'), so their respective emphatic forms with the gemination of the onset of the second syllable do not violate ALIGNGEM-L (Modifier) (e.g. [ittai], [akkaɾɯi]). However, as long as ALIGNGEM-L(Modifier) and WT-IDENT-IO[+cons] are ranked in the same stratum no lower than that for WT-IDENT-V$_{FIN}$-IO, then forms with gemination can never beat forms with vowel lengthening alone (e.g. [itaːi], [akaɾɯːi]).

(49) Relationship of four constraints 2

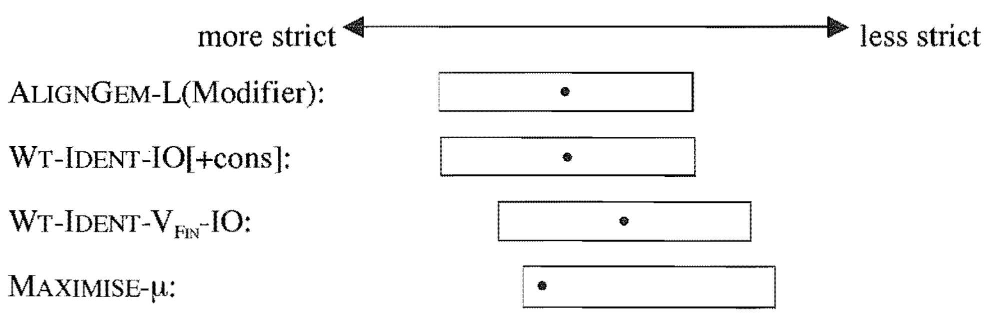



(50) Tableau for /jasɯ+i/ ‘cheap’ 4

| Input: /jasɯ+i/ | WT-IDENT-$V_{FIN}$-IO | ALIGNGEM-L(Modifier) | WT-IDENT-IO [+cons] | MAXIMISE -μ |
|---|---|---|---|---|
| a. jasɯ:i | *! | | | **** |
| b. ☞ jassɯi | | * | * | **** |
| c. jassɯ:i | *! | * | * | *** |

When the speaker wishes to put more emphasis on a word, it is the selection point of MAXIMISE-μ that shifts towards the left edge of the strictness band, and this allows MAXIMISE-μ to dominate the other three.

(51) Relationship of four constraints 3




(52) Tableau for /jasɯ+i/ ‘cheap’ 5

| Input: /jasɯ+i/ | MAXIMISE -μ | ALIGNGEM-L(Modifier) | WT-IDENT-IO [+cons] | WT-IDENT-$V_{FIN}$-IO |
|---|---|---|---|---|
| a. jasɯ:i | ****! | | | * |
| b. jassɯi | ****! | * | * | |
| c. ☞ jassɯ:i | *** | * | * | * |

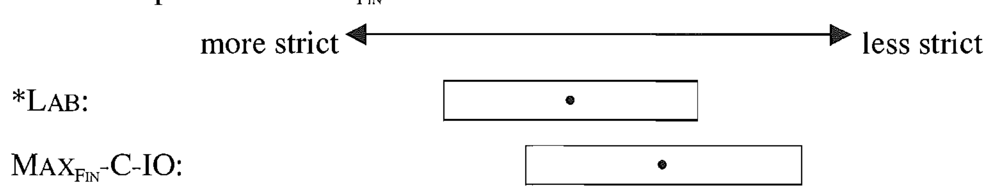
By adopting Hayes' theory, we can manage to account for variation observed in the process of emphasising adjectives.[72] In fact, this theory can also be adopted to account for variations observed elsewhere. In the next section, we will first look into a case in which the application of 'gradient well-formedness' seems appropriate, then we will deal with a few issues arising from the discussions in this chapter.

## 8.6 RELATED ISSUES

### 8.6.1 [kedo]~[kedomo] 'although'

In Chapter 4, 4.7, we discussed the variants among contracted forms in terms of constraint reranking. We posited two transitional stages as the degree of formality shifts from formal speech to casual speech, and showed how /te#simaw+ɯ/ 'end up –ing', /keɾeba/ 'if' and /keɾedomo/ surface at each stage. There, we could account for [keɾedomo]~[keɾedo]~[kedo] by simply demoting MAX-V-IO and MAX-C-IO within the constraint hierarchy but could not allow [kedomo] to surface at any stage of the constraint reranking due to the domination of MAX$_{\text{FIN}}$-C-IO by *LAB. However, if we consider that the relationship between these two constraints is similar to that of the four constraints we discussed above, we should be able to obtain both [kedo] and [kedomo] as optimal in casual speech. Let us assume that MAX$_{\text{FIN}}$-C-IO and *LAB are placed under ordinary circumstances as follows:

(53) Relationship between MAX$_{\text{FIN}}$-C-IO and *LAB 1



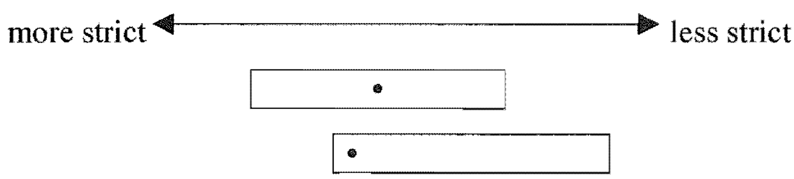

[72] This ranking, in fact, causes a problem, but only when the root-final vowel is /i/, as in /jasasi+i/ 'easy, kind'. /i+i/ surfaces as [iː] to avoid an OCP(IdentV) violation so [jassaʃiː], for instance, violates MAXIMISE-μ less seriously than [jasaʃiːi] and [jassaʃiːi]. [jasaʃiːi] can be selected as optimal with Hayes' 'gradient well-formedness' theory (see the previous section), but [jassaʃiːi] will never be. (*[jassaʃiːiː] violates high-ranking OCP(IdentV) so it has no chance of beating [jassaʃiː], [jasaʃiːi] or [jassaʃiːi].) This issue will be discussed again in 9.4.5.

(54) Tableau for /keɾedomo/ 'although' in casual speech 1

| Input: /keɾedomo/ | *LAB | MAX$_{FIN}$-C-IO | *ɾ |
|---|---|---|---|
| a. ☞ kedo | | * | |
| b. keɾedo | | * | *! |
| c. kedomo | *! | | |
| d. keɾedomo | *! | | * |

*LAB >> MAX$_{FIN}$-C-IO >> *ɾ opts for [kedo] and this endorses the fact that [kedo] is used almost exclusively in casual speech. However, when one wishes to make it sound slightly less casual, the selection point of MAX$_{FIN}$-C-IO makes the leftward movement within its strictness band and outrank *LAB, which will allow [kedomo] to surface as optimal.[73]

(55) Relationship between MAX$_{FIN}$-C-IO and *LAB 2




(56) Tableau for /keɾedomo/ 'although' in casual speech 2

| Input: /keɾedomo/ | MAX$_{FIN}$-C-IO | *LAB | *ɾ |
|---|---|---|---|
| a. kedo | *! | | |
| b. keɾedo | *! | | * |
| c. ☞ kedomo | | * | |
| d. keɾedomo | | * | *! |

[73] As mentioned in Chapter 4, fn.44, this process does not affect the selection of the optimal candidate for /keɾeba/ 'if', that is, it does not select *[keba], due to high-ranking *VbV(Closed), as seen in the following tableau (candidates that violate ONSET are omitted).

| Input: /keɾeba/ | *VbV(Closed) | MAX$_{FIN}$-C-IO | *LAB | *ɾ | MAX-V-IO |
|---|---|---|---|---|---|
| a. ☞ k$^j$a | | * | | | * |
| b. ka | | * | | | **! |
| c. keɾ$^j$a | | * | | *! | |
| d. keɾa | | * | | *! | * |
| e. keba | *! | | * | | * |
| f. keɾeba | *! | | * | * | |

8.6.2 Emphatic Forms of Adverbs

[tottemo] 'very', [jappaɾi] 'as expected, after all' and [ammaɾi] 'not much/very' (1.i.a-c) are three of the most commonly used emphatic forms of adverbs, in which the gemination of the onset of the second syllable is observed. Unlike emphatic forms of adjectives, these words never have an emphatic form with the lengthening of the final vowel (e.g. *[totemo:], *[jahaɾi:], *[amaɾi:]). It seems that the lengthening of the word-final segment is disallowed in open class, due to the following constraint:

(57) Constraint 61

**WT-IDENT-WD$_{FIN}$-IO(Open)**: In open class no lengthening or shortening of the word-final segment is allowed.[74]

This constraint is not normally violated but it can be when one wishes to show hesitation (e.g. [amaɾi:]/[ammaɾi:] 'not very ...'). I thus rank it in the second stratum with ¬WT-IDENT-IO(Modifier), one stratum higher than the one WT-IDENT-IO(Open) belongs to, according to Pāṇini Principle. Let us draw a tableau for /totemo/ 'very' to see how this constraint affects the selection of the optimal candidate.

(58) Tableau for /totemo/ 'very'[75]

| Input: /totemo/ | WT-ID-WD$_{FIN}$(Op) | ¬WT-ID (Mod) | WT-ID (Open) | WT-ID -V$_{MID}$ | WT-ID -V$_{INIT}$ | ALIGNG -L(Mod) | WT-ID [+cons] |
|---|---|---|---|---|---|---|---|
| a. totemo | | *! | | | | | |
| b. ☞ tottemo | | | * | | | * | * |
| c. to:temo | | | * | | *! | | |
| d. totemmo | | | * | | | ** | *! |
| e. tote:mo | | | * | *! | | | |
| f. totemo: | *! | | | | | | |

[74] The specification 'open' is necessary because /a/ of the topic/contrast marker /wa/ can be lengthened in casual speech in order to compensate for a loss of mora count (e.g. /ko+ɾe#(w)a/ → [koɾʲa:] 'this (TOPIC)'). See Chapter 6, 6.4 for discussion on this. The specification 'word' is also necessary so that in an adjective the root-final vowel can still be lengthened but the word-final vowel cannot (e.g. /jasɯ+i/ → [jasɯ:i]/*[jasɯi:] 'cheap'; /i/: tense morpheme – adjectives always end in closed-class suffix(es)).

[75] Candidates with more than one additional mora are omitted from the tableau, because they all violate at least one of WT-IDENT-V$_{MID}$-IO, WT-IDENT-V$_{INIT}$-IO and ALIGNGEM-L(Modifier) and they have no chance of beating the actual output [tottemo] (58b).

Although the candidate with the lengthening of the word-final vowel (58f) satisfies ¬WT-IDENT-IO(Modifier), it fatally violates WT-IDENT-WD$_{FIN}$-IO(Open) so it is the first to be eliminated among possible emphatic forms, and the candidate with the gemination of the onset of the second syllable (58b) is correctly selected as optimal. The same can be said of the emphatic forms of /jahaɾi/ 'as expected, after all' and /amaɾi/ 'not much/very'. The domination of WT-IDENT-V$_{FIN}$-IO by WT-IDENT-WD$_{FIN}$-IO(Open) ensures that the final segment, which is part of an open-class item, is never lengthened in adverbs.

8.6.3 Avoidance of Nasal Gemination

In 8.3 we saw that emphatic forms with nasal gemination are rated comparatively low and that, when a root is composed of (C)V.NV.CV, in which the second C is a stop (e.g. /tɯmeta/ 'cold'), the gemination of the stop is accepted as much as that of the nasal. This means that a violation of ALIGNGEM-L(Modifier) is considered to be no more serious than that of a constraint that militates against nasal gemination. When a root is composed of (C)V.NV.CV, in which the second C is a fricative (e.g. /tanosi/ 'happy'), on the other hand, the gemination of the nasal is still preferred. This implies that there is a constraint that differentiates stops from fricatives (or continuants in general) in terms of weight. I thus propose the following three constraints:

(59) Constraints 62

a. **WT-IDENT-IO[+nasal]**: No lengthening/shortening of nasals.

b. **WT-IDENT-IO[+continuant]**: No lengthening/shortening of continuants.

c. **WT-IDENT-IO[+sonorant]**: No lengthening/shortening of sonorants.

If ALIGNGEM-L(Modifier) and WT-IDENT-IO[+nasal] are ranked in the same stratum, both [tsɯmmetai] and [tsɯmettai] and both [tannoʃiː] and [tanoʃʃiː] will be able to proceed to the next stratum. If WT-IDENT-IO[+sonorant] is dominated by WT-IDENT-IO [+continuant] below ALIGNGEM-L(Modifier) and WT-IDENT-IO[+nasal], then a candidate with the gemination of a continuant will be eliminated first, followed by a candidate with the gemination of a nasal, as seen in the following tableaux:

(60) Tableaux for /tɯmeta+i/ 'cold' and /tanosi+i/ 'happy'

| Input: /tɯmeta+i/ | ALIGNGEM-L(Modifier) | WT-IDENT-IO[+nasal] | WT-IDENT-IO[+cons] | WT-IDENT-IO[+cont] | WT-IDENT-IO[+son] |
|---|---|---|---|---|---|
| a. tsɯmmetai | * | * | * | | *! |
| b. ☞ tsɯmettai | ** | | * | | |

| Input: /tanosi+i/ | ALIGNGEM-L(Modifier) | WT-IDENT-IO[+nasal] | WT-IDENT-IO[+cons] | WT-IDENT-IO[+cont] | WT-IDENT-IO[+son] |
|---|---|---|---|---|---|
| c. ☞ tannoʃi: | * | * | * | | * |
| d. tanoʃʃi: | ** | | * | *! | |

The constraint ranking in the above tableaux can precisely predict what segment in which position should be geminated in the process of emphasising adjectives when a nasal is present in the root.

### 8.6.4 PARSE-μ and WEIGHT-IDENTITY Constraints

In this subsection we will discuss if the hierarchy of WEIGHT-IDENT constraints we have established in 8.4.2 (i.e. WT-IDENT-$V_{MID}$-IO >> WT-IDENT-$V_{INIT}$-IO >> WT-IDENT-IO [+cons], WT-IDENT-$V_{FIN}$-IO) is compatible with our analysis of CL.

In Chapter 6, 6.7, we ranked PARSE-μ and WT-IDENT-IO in the same stratum in order to explain why both a form with CL and a form without CL co-exist in casual speech. Here are tableaux for /ko+ɾe#(w)a/ 'this (TOPIC)' and /so+o#ka/ 'I see'.

(61) Tableau for /ko+ɾe#(w)a/ 'this (TOPIC)' in casual speech (repeated from Ch.6 (42))

| Input: /ko+ɾe#(w)a/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | PARSE-μ | WT-IDENT-IO | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ koɾʲa: | | | | | * | |
| b. ☞ koɾʲa | | | | * | | |
| c. koɾa | | | | * | | *! |
| d. koɾewa | | | *! | | | |
| e. koɾea | | *! | | | | |
| f. koɾa: | *! | | | | * | * |

(62) Tableaux for /so+o#ka/ 'I see' in casual speech (repeated from Ch.6 (44))[76]

| Input: /$so_1$+$o_2$#ka/ | ¬WT-IDENT-IO | PARSE-μ | WT-IDENT-IO | UNIFORMITY-IO |
|---|---|---|---|---|
| a. $so_{12}$:ka | *! | | | * |
| b. ☞ $so_{12}$kka | | | ** | * |
| c. ☞ $so_{12}$ka | | * | * | * |

Let us first look at Tableau (61). The violation of WT-IDENT-IO by one of the optimal candidates [korʲa:] (60a) is due to the lengthening of the final vowel,[77] thus in this tableau WT-IDENT-IO virtually means WT-IDENT-$V_{FIN}$-IO.[78]

(63) Tableau for /ko+re#(w)a/ 'this (TOPIC)' in casual speech (revised)

| Input: /ko+re#(w)a/ | NO-PARSE-μ (DelSeg) | ONSET | *LAB | PARSE -μ | WT-IDENT-$V_{FIN}$-IO | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ korʲa: | | | | | * | |
| b. ☞ korʲa | | | | * | | |
| c. kora | | | | * | | *! |
| d. korewa | | | *! | | | |
| e. korea | | *! | | | | |
| f. kora: | *! | | | | * | * |

This implies that WT-IDENT-$V_{MID}$-IO and WT-IDENT-$V_{INIT}$-IO are ranked higher than PARSE-μ (from WT-IDENT-$V_{MID}$-IO >> WT-IDENT-$V_{INIT}$-IO >> WT-IDENT-$V_{FIN}$-IO) and that PARSE-μ, WT-IDENT-IO[+cons] and WT-IDENT-$V_{FIN}$-IO are all ranked in the same stratum. Let us now redraw a tableau for /so+o#ka/ 'I see' to see if replacing WT-IDENT-IO with relevant WEIGHT-IDENTITY constraints still allows two candidates to surface as optimal (*3μ and a candidate that violates it are added to the tableau).[79]

[76] UNIFORMITY-IO is demoted below PARSE-μ and WT-IDENT-IO, as established in Chapter 7, 7.2.2.
[77] /(w)a/ is a particle so the lengthening of the vowel does not incur a violation of high-ranking WT-IDENT-$WD_{FIN}$-IO(Open).
[78] This also applies to the reduction of conditional morphemes /eba/, /reba/ and /kereba/ 'if' (see Chapter 6, 6.5 and 6.7).
[79] I assume that ¬WT-IDENT-IO dominates all 'class non-specific' WEIGHT-IDENTITY constraints and that MAXIMISE-μ is irrelevant to the process of CL, whether it is 'inverse' or not, because we are not dealing with the register of emphatic speech.

(64) Tableaux for /so+o#ka/ 'I see' in casual speech (revised)

| Input: /so$_1$+o$_2$#ka/ | *3μ | ¬WT-IDENT-IO | WT-IDENT-V$_{INIT}$-IO | PARSE-μ | WT-IDENT-IO[+cons] | UNIFORMITY-IO |
|---|---|---|---|---|---|---|
| a. so$_{12}$:kka | *! | | | | * | * |
| b. so$_{12}$:ka | | *! | | | | * |
| c. ☞ so$_{12}$kka | | | * | | * | * |
| d. ☞ so$_{12}$ka | | | * | * | | * |

As can be seen in the above tableau, the WEIGHT-IDENTITY constraint hierarchy needed to account for emphatic expressions does not cause a problem with the analysis of CL, thus we can conclude that PARSE-μ is ranked in the same stratum as WT-IDENT-IO[+cons] and WT-IDENT-V$_{FIN}$-IO as well as ALIGNGEM-L(Modifier) and MAXIMISE-μ.

## 8.7 SUMMARY

In Japanese, when the speaker wishes to emphasise the degree of something, he/she can choose to add an extra mora or two to an adjective or an adverb in a number of ways. In this chapter we mainly focussed on the process of emphasising adjectives and, by examining the results of the survey conducted between November 2002 and January 2003, we identified the characteristics of the process of emphasis as follows:

(65) Characteristics of the process of emphasis[80]

a. Vowel lengthening is the most widely accepted way of emphasising adjectives. Gemination and the combination of both are also accepted well. Except for [sɯŋŋoi] for /sɯgo+i/ 'terrific, terrible', prenasalisation is considered to be unnatural if not rejected completely, and so are the other methods (e.g. double vowel lengthening, double gemination, etc.).

b. The root-final vowel is by far the most preferred segment to be lengthened. The lengthening of the other vowels is considered to be unnatural, although there are some who lengthen the vowel in the initial syllable.

c. The onset of the second syllable within a root is the most preferred locus of gemination. Gemination in any other locus is considered to be far less natural,

[80] Both vowel lengthening and gemination target peripheral segments, but at opposite ends to each other. This is possibly so in order to accommodate both vowel lengthening and gemination when the speaker wishes to express an adjective in a more emphatic way.

except when a nasal in $C_2$ is followed by a voiceless stop in $C_3$ (or $C_4$), in which case the gemination of the stop is slightly more favoured.

d. Not the vowel quality or the features of segments, but the locus determines which vowel is to be lengthened and/or which segment to be geminated, except for the context mentioned in (65c).

Based on the above findings, an attempt was made to account for the formation of the emphatic forms within the framework of OT. As the process of emphasis is only observed in adjectives and adverbs, we needed to differentiate these parts of speech from the others, and to this end an anti-faithfulness constraint ¬WT-IDENT-IO(Modifier), which is promoted above WT-IDENT-IO(Open) only in the register of emphatic speech, was first proposed.

Among emphatic forms with gemination, the one with the gemination of the onset of the second syllable is by far the most widely accepted option. In order to account for this, I proposed ALIGNGEM-L(Modifier), which requires the left edge of a geminate to coincide with the leftmost consonant of a modifier.

By simply placing ALIGNGEM-L(Modifier) in the same stratum as WT-IDENT-IO, we could account for the preference for vowel lengthening over gemination in the process of emphasis. We then divided WT-IDENT-IO into four and established the subhierarchy of WEIGHT-IDENTITY constraints (i.e. WT-IDENT-$V_{Mid}$-IO >> WT-IDENT-$V_{Init}$-IO >> WT-IDENT-IO[+cons], WT-IDENT-$V_{Fin}$-IO) in order to explain why the lengthening of the root-final vowel , as well as gemination, is more favoured than the lengthening of the other vowels.

Emphasis by means of both vowel lengthening and gemination is also commonly observed in emphatic speech but due to multiple violations of WT-IDENT-IO(Open), our constraint ranking ousted emphatic forms of both characteristics at a very early stage of the selection process. We thus employed MAXIMISE-μ(Modifier) to neutralise the effect of WT-IDENT-IO(Open) and successfully retained such forms in the competition until most other competitors were eliminated.

A constraint hierarchy in strict domination order does not allow more than one candidate to be selected as optimal and our constraint ranking chose vowel lengthening as the sole option to emphasise adjectives. In order to solve this problem, we adopted Hayes' 'gradient well-formedness' theory and, by considering that each constraint is made of a strictness band in which the selection point can shift and by allowing the strictness bands of

ALIGNGEM-L(Modifier), WT-IDENT-IO[+cons], WT-IDENT-$V_{Fin}$-IO and MAXIMISE-μ to overlap with each other, we managed to obtain multiple optimal candidates.

In this chapter, we also accounted for avoidance of three moras within a syllable, avoidance of the lengthening of the word-final segment and preference for gemination of stops over that of nasals within the framework of OT.

To conclude the chapter, I will illustrate the ranking of constraints involved in the process of emphasis.

(66) Constraint ranking in emphatic speech[81]

OCP(IdentV), **WT-IDENT-$WD_{FIN}$-IO(Open)**, **¬WT-IDENT-IO(Modifier)**, ***3μ(Modifier)**

>>

MAX-IO(Open), **MAXIMISE-μ(Modifier)**, WT-IDENT-IO(Open)

>>

MAX-IO(Root)

>>

**WT-IDENT-$V_{MID}$-IO**

>>

**WT-IDENT-$V_{INIT}$-IO**

>>

**ALIGNGEM-L(Modifier)**, **MAXIMISE-μ**, PARSE-μ, **WT-IDENT-IO[+cons]**, **WT-IDENT-IO[+nasal]**, **WT-IDENT-$V_{FIN}$-IO**

>>

**WT-IDENT-IO[+continuant]**, IDENT-IO(lateral), NOVOIGEM

>>

**WT-IDENT-IO[+sonorant]**

>>

UNIFORMITY-IO

[81] As long as IDENT-IO(lateral) and NOVOIGEM are ranked below WT-IDENT-IO[+cons], emphatic forms with gemination of a voiced segment or sonorant in the onset of the second syllable are permissible. Also, the domination of WT-IDENT-IO[+sonorant] by NOVOIGEM below ALIGNGEM-L(Modifier) and WT-IDENT-IO [+nasal] ensures that the gemination of nasal is preferred to that of a voiced stop in such words as /onazi/ 'same' (this adjective root does not require the tense morpheme /i/ when directly modifying a noun, thus the left edge of the root coincides with the left edge of the word, hence no emphatic form with the final-vowel lengthening (i.e. *[onadʒiː]) due to high-ranking WT-IDENT-$WD_{FIN}$-IO(Open)).

| Input: /onazi/ | ¬WT-IDENT -IO(Mod) | WT-IDENT -IO(Open) | ALIGNG -L(Mod) | WT-IDENT -IO[+nas] | WT-IDENT-IO[+cons] | NOVOI GEM | WT-IDENT -IO[+son] |
|---|---|---|---|---|---|---|---|
| a. onadzi | *! | | | | | | |
| b. ☞ onnadʒi | | * | | * | * | | * |
| c. onaddʒi | | * | * | | * | *! | |

# CHAPTER NINE

## CONCLUSION

### 9.1 INTRODUCTION

In the last seven chapters we closely examined various aspects of Japanese and established the grammar underlying formal speech and its casual counterpart within the framework of Optimality Theory. The aspects we looked into in order to account for formal Japanese phonology and casual Japanese phonology are as follows:

(1) Summary of points of discussion

i. General formal phonology
   a. Verbal paradigms
   b. Consonant alternations in the *ga*-, *ha*- and *ra*-columns
   c. Sequential voicing
   d. Formation of the *te*-form of verbs

ii. Casual speech phonology
   a. Avoidance of hiatus in the *te*-form with vowel-initial auxiliary verbs
   b. Labial deletion
   c. Avoidance of flaps by means of deletion or nasalisation
   d. Compensatory lengthening
   e. Vulgarisms
   f. Emphatic expressions

After having established the constraint ranking for formal speech with 37 constraints, we have invoked an additional 50 constraints, excluding local conjunction constraints, to account for the processes mentioned in (1.ii). In this chapter, we will first add these 50 constraints to the constraint ranking established in Chapter 2 in order to finalise the grammar underlying formal speech in Japanese, then present the grammar underlying casual speech by means of constraint reranking.[1]

The processes in casual speech we have discussed in Chapters 3 to 8 can by no means cover all the processes observed in casual speech and there are those that cannot be accounted for with our constraint ranking. We will make brief reference to such processes

[1] A partial constraint ranking for casual speech was presented at the end of each chapter, but such a constraint ranking only included the constraints relevant to the process we were discussing.

later in the chapter as topics of future investigation, which will be followed by discussions on the treatment of the *sa-* and *ta-*column consonants and that of the verbal suffixes.

## 9.2. FORMAL JAPANESE GRAMMAR

In Chapter 2 we established the following constraint ranking for formal speech:

(2) Constraint ranking for formal speech

| Faithfulness constraints | | Markedness constraints | Other constraints |
|---|---|---|---|
| IDENT family | Others | | |
| IDENT-IO(cont)[cor] | CONTIG-IO(Open)<br>DEP-IO[+back]<br>DEP-IO[-high]<br>M-PARSE(neg)<br>M-PARSE(tense)<br>MAX-IO(Float)<br>MAX-IO[+obs][cor]<br>MAX-V-IO | CODACOND<br>CVLINKAGE(*HI)<br>CVLINKAGE(*HU)<br>CVLINKAGE(I)<br>CVLINKAGE(*TU)<br>NOVOIGEM<br>*NC̥<br>*[ŋ<br>*Nɾ<br>*[ɾ<br>*wV[-low] | |
| | >> | | |
| IDENT-ONSET-IO(place) | DEP-V-IO | | |
| | >> | | |
| IDENT-IO(lateral)<br>IDENT-IO(place)<br>IDENT-IO[+ObsVoice] | MAX-IO(Open)<br>MAX-C-IO | | |
| | >> | | |
| IDENT-IO(anterior) | | ONSET<br>NO-D$^{2}_{m}$<br>*g | |
| | >> | | |
| IDENT-IO(nasal)<br>IDENT-IO(strident) | | | |
| | >> | | |
| | | | REALISE-M |
| | >> | | |
| IDENT-IO(voice) | DEP-IO | NO-D | |

Let us add the constraints introduced in Chapters 3 to 9, including two local conjunction constraints to the above.

(3) Constraint ranking for formal speech (final)[2, 3]

| | Faithfulness constraints | | Markedness constraints | Other constraints |
|---|---|---|---|---|
| | IDENT family | Others | | |
| 1 | IDENT-IO(cont)[cor]<br>IDENT-LONGV$_{\text{INIT}}$-IO(Open)<br>[IDENT-IO(voice) & IDENT-IO (nasal)]<br>[IDENT-IO(nasal) & IDENT-IO (cont)] | CONTIG-IO(Open)<br>DEP-IO[+back]<br>DEP-IO[-high]<br>M-PARSE(neg)<br>M-PARSE(potential)<br>M-PARSE(tense)<br>MAX-IO(Float)<br>MAX-IO[+obs][cor]<br>MAX-V-IO<br>NO-PARSE-μ (DelSeg) | CODACOND<br>CVLINKAGE(*HI)<br>CVLINKAGE(*HU)<br>CVLINKAGE(I)<br>CVLINKAGE(*TU)<br>NOVOIGEM<br>NUCLEUS<br>*DIPHTHONG<br>*NC̥<br>*[ŋ<br>*Nɾ<br>*[ɾ<br>*wV[-low] | ALIGN-SFX[2] |
| | | >> | | |
| 2 | IDENT-ONSET-IO(place)<br>WT-IDENT-WD$_{\text{FIN}}$-IO(Open) | DEP-IO[-back]<br>DEP-V-IO | *3μ(Modifier) | OCP(IdentV) |
| | | >> | | |
| 3 | IDENT-IO(back)<br>IDENT-IO(lateral)<br>IDENT-IO(place)<br>IDENT-IO[+ObsVoice]<br>WT-IDENT-IO(Open) | ANCHOR-IO(Open)<br>MAX-IO(Open)<br>MAX-C-IO<br>MAX$_{\text{INIT}}$-C-IO | *COMPLEX<br>*VbV(Closed) | ALIGN-L(Open)<br>GRWD>ROOT(Open)<br>NO-CASUAL-MERGER |
| | | >> | | |
| 4 | IDENT-IO(anterior)<br>IDENT-IO(height)(Open) | | ONSET<br>NO-D$^2_m$<br>*g<br>*3μ | ALIGN-L(CaseParticle)<br>ALIGN-R(Open) |
| | | >> | | |
| 5 | IDENT-ONSET-IO(nasal) | | *LAB | |
| | | >> | | |
| 6 | | MAX-IO(Root)<br>MAX$_{\text{FIN}}$-C-IO | | |
| | | >> | | |
| 7 | | | *ɾ | |
| | | >> | | |
| 8 | IDENT-IO(nasal)<br>IDENT-IO(strident)<br>WT-IDENT-V$_{\text{MID}}$-IO | | | |

---

[2] *STRUC has been replaced with the *V subhierarchy. WT-IDENT-IO has been subdivided into WT-IDENT-IO[+cons], WT-IDENT-V$_{\text{INIT}}$-IO, WT-IDENT-V$_{\text{MID}}$-IO and WT-IDENT-V$_{\text{FIN}}$-IO.

[3] The eighth and tenth strata are divided into five and six substrata, respectively, to accommodate the hierarchy of seven WEIGHT-IDENTITY constraints and the *V subhierarchy, respectively.

| | | | | |
|---|---|---|---|---|
| | | >> | | |
| | WT-IDENT-V$_{INIT}$-IO | | | |
| | | >> | | |
| | WT-IDENT-IO[+cons]<br>WT-IDENT-IO[+nasal]<br>WT-IDENT-V$_{FIN}$-IO | PARSE-μ | | ALIGNGEM-L(Modifier) |
| | | >> | | |
| | WT-IDENT-IO[+continuant] | | | |
| | | >> | | |
| | WT-IDENT-IO[+sonorant] | | | |
| | | >> | | |
| 9 | IDENT-IO(height)(Closed) | | | |
| | | >> | | |
| 10 | | | *i | |
| | | >> | | |
| | | | *ɯ | |
| | | >> | | |
| | | UNIFORMITY-IO | | |
| | | >> | | |
| | | | *e | |
| | | >> | | |
| | | | *o | |
| | | >> | | |
| | | | *a | |
| | | >> | | |
| 11 | | | | REALISE-M |
| | | >> | | |
| 12 | IDENT-IO(continuant)<br>IDENT-IO(voice)<br>¬IDENT$_{FIN}$-IO[+back](Root)<br>¬WT-IDENT-IO<br>¬WT-IDENT-IO(Modifier) | DEP-IO | NO-D | MAXIMISE-μ<br>MAXIMISE-μ(Modifier) |

Based on this constraint ranking for formal speech, we will establish the final constraint ranking for casual speech through constraint reranking, then account for inverse CL (Chapter 6), vulgarisms (Chapter 7) and emphatic speech (Chapter 8) by upgrading some of the constraints.

## 9.3 CASUAL JAPANESE GRAMMAR

In Chapters 3 to 6 we discussed a number of processes observed in casual speech, namely, syncope (Chapter 3), reduction by means of labial and/or flap deletion (Chapter 4), flap nasalisation (Chapter 5) and CL caused by glide formation or vowel coalescence (Chapter 6). Here are some examples.

(4) Casual speech processes[4]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | tabe+te#i+ɾɯ | tabeteiɾɯ | tabeteɾɯ | 'be eating' |
| b. | te#simaw+ɯ | teʃimaɯ | tʃaɯ | 'end up –ing' |
| c. | keɾedomo | keɾedomo | kedo | 'although' |
| d. | keɾeba | keɾeba | $k^ja$ / $k^ja$: | 'be eating' |
| e. | ɾaɾe+na+i | ɾaɾenai | ɾannai | 'cannot (do), be not (done)' |
| f. | kaeɾ+ɯ#no | kaeɾɯno | n/a | 'return?, will return' |
| g. | kaeɾ+(ɯ)#no | n/a | kaenno | 'return?, will return' |
| h. | koɾe#wa | koɾewa | n/a | 'this (TOPIC)' |
| i. | koɾe#(w)a | n/a | $ko\text{ɾ}^ja$ / $ko\text{ɾ}^ja$: | 'this (TOPIC)' |
| j. | bokɯ#wa | bokɯwa | n/a | 'I (TOPIC)' |
| k. | bokɯ#(w)a | n/a | boka: | 'I (TOPIC)' |

We have seen in respective chapters that all these processes can be accounted for by simply demoting MAX-C-IO and MAX-V-IO to the 8th stratum and the 12th stratum, respectively. The following is the final constraint ranking for casual speech:

(5) Constraint ranking for casual speech (final)

| | Faithfulness constraints | | Markedness constraints | Other constraints |
|---|---|---|---|---|
| | IDENT family | Others | | |
| 1 | IDENT-IO(cont)[cor]<br>IDENT-LONGV$_{\text{INIT}}$-IO(Open)<br>[IDENT-IO(voice) & IDENT-IO (nasal)]<br>[IDENT-IO(nasal) & IDENT-IO (cont)] | CONTIG-IO(Open)<br>DEP-IO[+back]<br>DEP-IO[-high]<br>M-PARSE(neg)<br>M-PARSE(potential)<br>M-PARSE(tense)<br>MAX-IO(Float)<br>MAX-IO[+obs][cor]<br>NO-PARSE-μ (DelSeg) | CODACOND<br>CVLINKAGE(*HI)<br>CVLINKAGE(*HU)<br>CVLINKAGE(I)<br>CVLINKAGE(*TU)<br>NOVOIGEM<br>NUCLEUS<br>*DIPHTHONG<br>*NC̥<br>*[ŋ<br>*Nɾ<br>*[ɾ<br>*wV[-low] | ALIGN-SFX[2] |

[4] In regard to (4f-k), I consider (i) the vowels in the tense morphemes /ɯ/ and /ɾɯ/ become ghost segments in casual speech when followed by a /n/-initial clitic and (ii) the topic/contrast marker has two distinct underlying representations, one for formal speech (i.e. /wa/) and the other for casual speech (i.e. /(w)a/). See Chapter 5, 5.3 and 5.5.3, respectively, for discussion on these.

| | | | | |
|---|---|---|---|---|
| | | >> | | |
| 2 | IDENT-ONSET-IO(place)<br>WT-IDENT-WD$_{FIN}$-IO(Open) | DEP-IO[-back]<br>DEP-V-IO | *3μ(Modifier) | OCP(IdentV) |
| | | >> | | |
| 3 | IDENT-IO(back)<br>IDENT-IO(lateral)<br>IDENT-IO(place)<br>IDENT-IO[+ObsVoice]<br>WT-IDENT-IO(Open) | ANCHOR-IO(Open)<br>MAX-IO(Open)<br>MAX$_{INIT}$-C-IO | *COMPLEX<br>*VbV(Closed) | ALIGN-L(Open)<br>GRWD>ROOT(Open)<br>NO-CASUAL-MERGER |
| | | >> | | |
| 4 | IDENT-IO(anterior)<br>IDENT-IO(height)(Open) | | ONSET<br>NO-D$^2_m$<br>*g<br>*3μ | ALIGN-L(CaseParticle)<br>ALIGN-R(Open) |
| | | >> | | |
| 5 | IDENT-ONSET-IO(nasal) | | *LAB | |
| | | >> | | |
| 6 | | MAX-IO(Root)<br>MAX$_{FIN}$-C-IO | | |
| | | >> | | |
| 7 | | | *ɾ | |
| | | >> | | |
| 8 | IDENT-IO(nasal)<br>IDENT-IO(strident)<br>WT-IDENT-V$_{MID}$-IO | **MAX-C-IO** | | |
| | | >> | | |
| | WT-IDENT-V$_{INIT}$-IO | | | |
| | | >> | | |
| | WT-IDENT-IO[+cons]<br>WT-IDENT-IO[+nasal]<br>WT-IDENT-V$_{FIN}$-IO | PARSE-μ | | ALIGNGEM-L(Modifier) |
| | | >> | | |
| | WT-IDENT-IO[+continuant] | | | |
| | | >> | | |
| | WT-IDENT-IO[+sonorant] | | | |
| | | >> | | |
| 9 | IDENT-IO(height)(Closed) | | | |
| | | >> | | |
| 10 | | | *i | |
| | | >> | | |
| | | | *ɯ | |
| | | >> | | |
| | | UNIFORMITY-IO | | |
| | | >> | | |
| | | | *e | |
| | | >> | | |
| | | | *o | |
| | | >> | | |
| | | | *a | |

>>

| | | | | |
|---|---|---|---|---|
| 11 | | | | Realise-M |

>>

| | | | | |
|---|---|---|---|---|
| 12 | Ident-IO(continuant)<br>Ident-IO(voice)<br>¬Ident$_{FIN}$-IO[+back](Root)<br>¬Wt-Ident-IO<br>¬Wt-Ident-IO(Modifier) | Dep-IO<br>**Max-V-IO** | No-D | Maximise-$\mu$<br>Maximise-$\mu$(Modifier) |

When the speakers of Japanese wish to express (i) 'friendliness', 'cuteness' and/or 'childishness' and (ii) 'roughness', they employ inverse CL and vulgarisms, respectively, and when they wish to express the degree of something emphatically, they employ another register of speech.

(6) Inverse CL, vulgarisms and emphatic expressions

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | so+o#ka | so:ka | sokka | 'I see' |
| b. | deka+i | dekai | deke: | 'huge' |
| c. | sɯgo+i | sɯŋoi | sɯŋo:i / sɯggoi / sɯggo:i | 'terrific, terrible' |

We accounted for all three processes by invoking anti-faithfulness constraints and, in case of emphatic speech, Maximise-$\mu$ and Maximise-$\mu$(Modifier). These constraints are all ranked very low in the constraint hierarchy so that they virtually have no effect on speech, whether formal or casual. However, when one wishes to express one of the nuances in question, these constraints are promoted to affect the configuration of the output. They are upgraded in each relevant register of speech as follows:

(7) Promotion of constraints according to the register of speech

| | | Constraints | From Stratum | To Stratum (Substratum) |
|---|---|---|---|---|
| a. | Inverse CL | ¬Wt-Ident-IO | 12 | 7 |
| b. | Vulgarisms | ¬Ident$_{FIN}$-IO[+back](Root) | 12 | 2 |
| c. | Emphatic | ¬Wt-Ident-IO(Modifier) | 12 | 2 |
| | | Maximise-$\mu$(Modifier) | 12 | 3 |
| | | Maximise-$\mu$ | 12 | 8 (3) |

Also, in emphatic speech, one undominated constraint and one high-ranking constraint in normal speech are downgraded to allow voiced obstruents and sonorants to be geminated.

(8) Demotion of constraints in emphatic speech

| Constraints | From Stratum | To Stratum (Substratum) |
|---|---|---|
| NoVoiGem | 1 | 8 (4) |
| Ident-IO(lateral) | 3 | 8 (4) |

With the exception of inverse CL, vulgarisms and emphatic expressions, in which some connotation not stored in the lexicon is expressed by deliberately making the surface form unfaithful to its underlying representation, the casual speech processes we have discussed so far can be accounted for by way of constraint reranking that only involves the demotion of Max-C-IO and Max-V-IO. However, not every process observed in casual speech is accountable with our constraint ranking. In the next section we will discuss some of the issues that could pose problems with our OT analysis.

## 9.4 PROBLEMS WITH OUR OT ANALYSIS

### 9.4.1 Violation of *NC̥ by Closed-Class Items

In Chapter 2, 2.3.1, we invoked undominated *NC̥ (Pater 1999) to account for /sin+te/ → [sinde] 'dying', /kam+te/ → [kande] 'biting' and so forth. The formation of the *te*-form remains the same even when the degree of formality shifts from formal to casual, thus *NC̥ is assumed to be still undominated in casual speech. However, it is violated in /anata/ → [anta] 'you (casual)'[5] (Chapter 3, fn.12, Chapter 6, fn.21) as well as the following:

(9) Violation of *NC̥ 1

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | so+no#toki | sonotoki | sontoki | 'that time' |
| b. | kimi#no#toko[6] | n/a | kimintoko | 'your place' |
| c. | bokɯ#no#ɯti | bokɯnoɯtʃi | bokɯntʃi | 'my house' |

A second person pronoun /anata/, the demonstrative adjective suffix /no/ followed by /toki/ 'time' and the genitive particle /no/ followed by /toki/ 'time', /toko/ 'place' or /ɯti/

[5] This is also pointed out by Itô & Mester (2003:138-139), who ascribe it to OO-correspondence.
[6] In Chapter 4, 4.4, we assumed that /tokoro/ has a casual speech allomorph: /toko/.

'house' are often contracted by means of vowel deletion in casual speech and the results violate *NC̥.[7] [nt] is also observed in other contexts when the speaker utters a phrase containing /no/ followed by a word-initial /t/ rapidly.[8]

(10) Violation of *NC̥ 2

| | Underlying | Surface (formal) | Surface (fast) | Gloss |
|---|---|---|---|---|
| a. | ko+no#tosi | konotoʃi | kontoʃi | 'this age' |
| b. | kimi#no#tame | kiminotame | kimintame | 'for your sake' |
| c. | bokɯ#no#tonaɾi | bokɯnotonaɾi | bokɯntonaɾi | 'next to me' |

This clearly indicates that *NC̥ is no longer undominated in casual speech. The difference between those that comply with *NC̥ and those that do not is which class item the nasal belongs to. When it belongs to an open-class item, such as a verb root, *NC̥ must be satisfied, but that does not seem to be the case when it belongs to a closed-class item. Only a nasal in open class seems to require the following voiceless segment to surface as voiced, thus we will probably need to rename undominated *NC̥ as ***N(Open)C̥**.

However, more general *NC̥ must still be active in casual speech, as [ns] and [ŋk] are unattested in Yamato vocabulary.[9]

(11) Compliance with *NC̥

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | so+no#setɯ | sonosetsɯ | sonosetsɯ[10] | 'that occasion' |
| b. | bokɯ#no#koto | bokɯnokoto | bokɯnokoto | 'about me' |

[7] /toko/ 'place' does not undergo contraction with the demonstrative adjective suffix /no/. This is probably because we already have a word for 'this place' (/ko+ko/), 'that place' (/so+ko/) and 'that place over there' (/aso+ko/) and there is no need to say /so+no#toko/ for 'that place', for instance.

[8] The vowel of the dative/locative/allative particle /ni/ can drop before /t/ as well in fast speech (e.g. /kimi#ni# todoke+ɾɯ/ → [kimintodokeɾɯ] 'deliver to you').

[9] [mp] never occurs in Yamato vocabulary due to ***p** (no single [p]; Itô & Meser 1995a).

[10] [soõsetʃɯ] is acceptable. A nasal surfaces as a nasalised vowel when directly followed by a voiceless fricative (i.e. /s/ or /h/) in Japanese, thus even in Foreign vocabulary [ns] is never attested.

That /nV#k/ → [ŋk] does not occur can be ascribed to a violation of IDENT-IO(place) (see Tableau (12)) but, no matter where we rank *NC̥, we cannot allow /nV#t/ → [nt] and prevent /nV#s/ → [ns] at the same time, as seen in Tableaux (13):

(12) Tableau for /bokɯ#no#koto/ 'about me'

| Input: /bokɯ#no#koto/ | IDENT-IO(place) | NC̥ | *o | MAX-V-IO |
|---|---|---|---|---|
| a. ☞ bokɯnokoto | | | **** | * |
| b. bokɯŋkoto | *! | * | *** | |

(13) Combined tableaux for /so+no#toki/ 'that time' and /so+no#setɯ/ 'that occasion'

i. NC̥ >> *o

| Input: | | NC̥ | *o | MAX-V-IO |
|---|---|---|---|---|
| /so+no#toki/ | a. sontoki | *! | ** | * |
| | b. ☹ sonotoki | | *** | |
| /so+no#setɯ/ | c. sonsetsɯ | *! | * | * |
| | d. ☞ sonosetsɯ | | ** | |

ii. *o >> NC̥

| Input: | | *o | *NC̥ | MAX-V-IO |
|---|---|---|---|---|
| /so+no#toki/ | a. ☞ sontoki | ** | * | * |
| | b. sonotoki | ***! | | |
| /so+no#setɯ/ | c. ☹ sonsetsɯ | * | * | * |
| | d. sonosetsɯ | **! | | |

The only solution to this problem is to invoke such a constraint as ***NC̥[+cont]**.

(14) Combined tableau for /so+no#toki/ 'that time' and /so+no#setɯ/ 'that occasion' (revised)

| Input: | | *NC̥[+cont] | *o | *NC̥ | MAX-V-IO |
|---|---|---|---|---|---|
| /so+no#toki/ | a. ☞ sontoki | | ** | * | * |
| | b. sonotoki | | ***! | | |
| /so+no#setɯ/ | c. sonsetsɯ | *! | * | * | * |
| | d. ☞ sonosetsɯ | | ** | | |

If we assume *N(Open)C̥ >> *NC̥[+cont] >> *o >> *NC̥ in casual speech, we should be able to account for (9), (10) and (11) as well as the formation of the *te*-form. However, this ranking cannot explain why /so+no#setɯ/ 'that occasion' can surface as [soõsetsɯ] in fast speech (see fn.10).

(15) Tableau for /so+no#setɯ/ 'that occasion' in fast speech[11]

| Input: /so+n$_1$o#setɯ/ | ONSET | *NC̥[+cont] | *o | *NC̥ | MAX-V-IO |
|---|---|---|---|---|---|
| a. sonsetsɯ | | *! | * | * | * |
| b. ☹ sonosetsɯ | | | ** | | |
| c. soõ$_1$setsɯ | *! | | ** | | * |

Vowel deletion between /n/ and a voiceless segment, thus, requires further investigation.

### 9.4.2 Violation of NO-CASUAL-MERGER by Compound Verbs

When we were discussing NO-CASUAL-MERGER in Chapter 5, 5.4, I mentioned that some compound verbs do merge in casual speech even though they are not identical in formal speech. Here are some examples.

(16) Compound verbs (from Chapter 5, fn.31)[12]

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | hɯQ+kake+ɾɯ | ɸɯkkakeɾɯ | ɸɯkkakeɾɯ | 'overcharge' |
| | hɯk+i#kake+ɾɯ | ɸɯkikakeɾɯ | ɸɯkkakeɾɯ | 'blow upon' |
| b. | hiQ+kom+ɯ | çikkomɯ | çikkomɯ | 'draw back' |
| | hik+i#kom+ɯ | çikikomɯ | çikkomɯ | 'bring around' |

NB: /Q/ indicates a moraic consonant with no specification of place. It can surface as the first half of a geminate, as seen above, or as a nasal, as in /oQ+das+ɯ/ → [ondasɯ] 'kick out' and /hiQ+mage+ɾɯ/ → [çimmaŋeɾɯ] 'bend with force'.

[11] ONSET cannot be demoted below MAX-IO(Root), which dominates *o, because avoidance of an ONSET violation by means of root deletion (e.g. /te#i+ɾɯ/ → [teɾɯ] 'be –ing') can be observed in fast speech as well as in semi-casual to casual speech (see Chapter 3, 3.3).

[12] Poser (1986) assumes that /i/ between two verb roots is epenthetic and that it is not underlyingly present. However, his assumption is not compatible with our OT analysis because, if we assume /hɯk#kake+ɾɯ/, for instance, as the underlying representation of [ɸɯkikakeɾɯ] 'blow upon', then [ɸɯkikakeɾɯ] will never be able to beat [ɸɯkkakeɾɯ] even in formal speech as the latter does not violate undominated CODACOND and is more faithful to its underlying representation than the former.

Let us draw tableaux for (16a) in casual speech to see the problem with our OT analysis.

(17) Tableaux for /hɯQ+kake+ɾɯ/ 'overcharge' and /hɯk+i#kake+ɾɯ/ 'blow upon' in casual speech

| Input: /hɯQ+kake+ɾɯ/ | CV LINK | ALIGN -SFX[2] | DEP -V | IDENT-ONS (place) | NO-CASUAL -MERGER | MAX (Open) | MAX -C |
|---|---|---|---|---|---|---|---|
| a. ☞ ɸɯkkakeɾɯ | | | | * | | | |
| b. ɸɯkakeɾɯ | | | | * | | | *! |
| c. ɸɯkikakeɾɯ | | | * | *! | | | |
| d. hɯkkakeɾɯ | *! | | | | | | |

| Input: /hɯk+i#kake+ɾɯ/ | CV LINK | ALIGN -SFX[2] | DEP -V | IDENT-ONS (place) | NO-CASUAL -MERGER | MAX (Open) | MAX -C |
|---|---|---|---|---|---|---|---|
| e. ɸɯkkakeɾɯ | | | | * | *! | | |
| f. ɸɯkakeɾɯ | | *! | | * | | * | * |
| g. ☹ ɸɯkikakeɾɯ | | | | * | | | |
| h. hɯkikakeɾɯ | *! | | | | | | |

High-ranking NO-CASUAL-MERGER is needed to account for non-merger between /siɾ+ana+i/ 'not know' and /sin+ana+i/ 'not die', between /naɾa/ 'if' and /nagaɾa/ 'while –ing' and so forth in casual speech (see Chapter 5, 5.4 for detailed discussion), but in the tableau for /hɯk+i#kake+ɾɯ/ 'blow upon' the actual output (17e) is eliminated by this constraint and the actual output for formal speech is selected as optimal in casual speech as well. Although the suffix /i/ in a compound verb often drops in casual speech when flanked between two /k/'s[13] in order to better satisfy low-ranking *STRUC, theoretically it should not if the form without /i/ merges with another compound verb, as is the case with /hɯQ+kake+ɾɯ/ 'overcharge' and /hɯk+i#kake+ɾɯ/ 'blow upon'. The problem with our current constraint ranking is that it fails to explain why casual merger is tolerated in compound verbs.

[13] This, I believe, is closely related to vowel devoicing. In Japanese, an unaccented high vowel flanked between two voiceless consonants is normally devoiced. (See Ohala (1983:203) for discussion on vowel devoicing and Faber & Vance (2000) for Japanese vowel devoicing.) Such a weakened vowel becomes more susceptible to deletion and tends to drop on condition that the reduction does not lead to a violation of CODACOND.

### 9.4.3 Violation of ALIGN-L(CaseParticle) by /no/ and /ni/

In Chapter 7, 7.2.4, we invoked ALIGN-L(CaseParticle)[14] to account for non-occurrence of vowel coalescence between a closed-class item and a case particle (e.g. /kimi#e/ → [kimie]/*[kime:] 'to you') unless the particle is directly preceded by an identical vowel (e.g. /kaɾe#e/ → [kaɾe:]/*[kaɾee] 'to him'). However, this constraint is often violated by the genitive particle /no/ (e.g. /kimi#no#toko/ → [kimintoko] 'your place'; see 9.4.1 (9)) and occasionally by the dative/locative/allative particle /ni/ (e.g. /sɯki#ni#naɾ+ɯ/ → [sɯkinnaɾɯ] 'become fond of'). The reason for this violation by means of vowel deletion in order to better satisfy lower-ranking *V cannot be accounted for with our current constraint ranking, as seen in the following tableau for /kimi#no#toko/ 'your place':

(18) Tableau for /kimi#no#toko/ 'your place' in casual speech

| Input: /kimi#no#toko/ | ALIGN-L(CaseParticle) | *o | *NC̥ | MAX-V-IO |
|---|---|---|---|---|
| a. ☹ kiminotoko | | *** | | |
| b. kimintoko | *! | ** | * | * |

Replacing ALIGN-L(CaseParticle) with such a local conjunction constraint as [ALIGN-L & IDENT-IO(height)] can still prevent /kimi#e/ 'to you' from surfacing as *[kime:], but it will end up preventing /bokɯ$_1$#(w)a$_2$/ 'I (TOPIC)' from surfacing as [boka$_{12}$:] (Chapter 6, 6.4) and allowing /hoN#o/ 'book (ACC.)' to surface as *[hono] instead of [hoõo].

(19) Tableaux for /kimi#e/ 'to you', /bokɯ$_1$#(w)a$_2$/ 'I (TOPIC)' and /hoN#o/ 'book (ACC.)' in casual speech

| Input: /kimi#e/ | [ALIGN-L & IDENT-IO(height)] | ONSET | IDENT-IO(height) (Closed) | *i | UNIFORMITY -IO |
|---|---|---|---|---|---|
| a. ☞ kimie | | * | | ** | |
| b. kime: | * | | *! | * | * |

[14] This constraint is also needed to account for /N#V/ → [V[+nasal]V]/*[NV] (e.g. /hoN#o/ → [hoõo]/*[hono] 'book (ACC.)').

| Input: /bokɯ₁#(w)a₂/ | [ALIGN-L & IDENT-IO(height)] | ONS | *LAB | IDENT-IO(height) (Closed) | *ɯ | UNIF |
|---|---|---|---|---|---|---|
| c. boka₁₂: | *! | | | ** | | * |
| d. ☹ bokɯwa | | | * | | * | |

| Input: /hoN#o/ | [ALIGN-L & IDENT-IO(height)] | ALIGN-R(Open) | ONSET | PARSE-μ |
|---|---|---|---|---|
| e. hoõo | | | **! | |
| f. ☹ hono | | * | | * |

Thus, this replacement will not work. It seems that case particles with initial /n/ behave differently from the other case particles. We could assume that, just like the vowels in the tense morphemes /ɯ/ and /ɾɯ/, the vowels in /no/ and /ni/ become ghost segments, but this still cannot explain why these particles violate ALIGN-L(CaseParticle) just to better satisfy lower-ranked *STRUC. At the moment I have no solution to offer to deal with this problem.

### 9.4.4 No Vowel Coalescence in /te#simaw/ Followed by a Back Vowel

In Chapter 7, fn.31, I mentioned that a /w/-final auxiliary verb root, such as /simaw/ 'end up –ing', and a suffix with an initial back vowel surface with a vowel sequence being intact even in casual speech.

(20) No vowel coalescence in /te#simaw/ + a suffix with an initial back vowel

| | Underlying | Surface (formal) | Surface (casual) | Gloss |
|---|---|---|---|---|
| a. | te#simaw+ɯ | teʃimaɯ | tʃaɯ | 'end up –ing' |
| b. | te#simaw+oo | teʃimao: | tʃao: | 'let's/will (do) completely' |

When /simaw/ is used as a full verb meaning 'put away', it never undergoes vowel coalescence with /ɯ/ or with /oo/ due to undominated IDENT-LONGV$_{\text{INIT}}$-IO(Open) and ALIGN-R(Open),[15] which is ranked in the same stratum as ONSET, as seen in the following tableau (candidates that violate undominated CVLINKAGE and/or *wV[-low] are omitted):

[15] I consider that ALIGN-R is violated when the segment at the right edge of a morpheme surfaces as the first mora of a long vowel (see Chapter 7, 7.2.3 for discussion on this).

(21) Tableau for /simaw+ɯ/ 'put away'

| Input: /simaw+ɯ/ | IDENT-LONGV$_{INIT}$-IO(Open) | ALIGN-R (OPEN) | IDENT-IO (height)(Op) | ONSET | IDENT-IO (height)(Cld) |
|---|---|---|---|---|---|
| a. ☞ ʃimaɯ | | | | * | |
| b. ʃima: | | * | | | *!* |
| c. ʃimo: | *! | * | * | | * |
| d. ʃimɯ: | *! | * | ** | | |

However, when the verb is used as an auxiliary verb, both IDENT-LONGV$_{INIT}$-IO(Open) and ALIGN-R(Open) have no role to play, thus our current constraint ranking will incorrectly opt for a candidate with vowel coalescence.

(22) Tableau for /te#simaw+ɯ/ 'end up –ing'[16]

| Input: /te#simaw+ɯ/ | ONSET | IDENT-IO (height)(Cld) | *ɯ | UNIFORMITY -IO | *o | *a |
|---|---|---|---|---|---|---|
| a. tʃaɯ | *! | | * | * | | * |
| b. ☹ tʃa: | | ** | | ** | | * |
| c. tʃo: | | ** | | ** | *! | |
| d. tʃɯ: | | ** | *! | ** | | |

If we replace ALIGN-R(Open) with ALIGN-R(Root), then we will be able to block vowel coalescence between /simaw/ and /ɯ/ or /oo/, but this will cause havoc to all the other consonant-final verb roots whose right edge does not coincide with the right edge of a syllable in most forms (e.g. /kam+ɯ/ → [kamɯ] 'bite'; see Chapter 5, 5.5.3 for discussion on ALIGN-R(Open) and its ranking).

The best I can think of to account for non-occurrence of vowel coalescence mentioned in (20) is to invoke **IDENT-IO(height)(Root)** and **IDENT$_{INIT}$-IO(height)**, which militate against any change in the values for height in roots and at the morpheme-initial position, respectively. If we rank these two constraints higher than or in the same stratum as ONSET, [tʃaɯ] will be selected as optimal, as seen in the following revised tableau of (22):

[16] I consider that /s/ and /i/ coalesce and surface as [ʃ] (see Chapter 4, fn.19), so that all the candidates incur at least one violation of UNIFORMITY-IO.

(23) Tableau for /te#simaw+ɯ/ 'end up –ing' (revised)

| Input: /te#simaw+ɯ/ | IDENT-IO (height)(Root) | IDENT$_{INIT}$-IO (height) | ONSET | IDENT-IO (height)(Closed) |
|---|---|---|---|---|
| a. ☞ tʃaɯ | | | * | |
| b. tʃa: | | **! | | ** |
| c. tʃo: | * | *! | | ** |
| d. tʃɯ: | **! | | | ** |

Neither IDENT-IO(height)(Root) nor IDENT$_{INIT}$-IO(height) is violated in any case of vowel coalescence we discussed in Chapter 7, except for those of vulgarisms (e.g. /deka+i/ → [deke:] 'huge'). If we assume that these constraints are demoted below *i (see Chapter 7, Tableaux (48)) in vulgarisms, we should be able to account for both the case with /simaw/ and vulgarisms, but the question is: is it really necessary to propose two new constraints which are only needed to account for just one process?[17]

9.4.5 Adjective Roots with Final /i/ in Emphatic Speech

In Chapter 8, fn.72, I raised a problem with our 'gradient well-formedness' analysis of emphatic speech, that is, even when MAXIMISE-μ dominates ALIGNGEM-L(Modifier), WT-IDENT-IO[+cons] and WT-IDENT-V$_{FIN}$-IO, we will not be able to obtain a form with both vowel lengthening and gemination for an adjective with root-final /i/ (e.g. /jasasi/ 'kind, easy'), as seen in the following tableau:

(24) Tableau for /jasasi+i/ 'kind, easy'

| Input: /jasasi+i/ | OCP (IDENTV) | ¬WT-ID (Mod) | MAXIMISE -μ | ALIGNGEM -L(Mod) | WT-ID [+cons] | WT-ID -V$_{FIN}$ |
|---|---|---|---|---|---|---|
| a. jasaʃi: | | *! | ***** | | | |
| b. jasaʃi:i | | | *****!* | | | * |
| c. ☞ jassaʃi: | | | **** | * | * | |
| d. jassaʃi:i | | | *****! | * | * | * |
| e. jassaʃi:i: | *! | | **** | * | * | * |
| f. jasaʃii | *! | | ******* | | | |

[17] The only other auxiliary verb root with a final /w/ that I can think of is /moraw/ 'receive the favour of –ing'. Therefore, if we are to propose those two constraints, they will only be needed to account for the lack of vowel coalescence in /simaw/ and /moraw/ in the dictionary and volitional forms.

When a sequence of two identical vowels occurs underlyingly, whether or not there is a morpheme boundary in it, it surfaces as a long vowel in Japanese. Because of this, the candidate with gemination alone (24c) violates MAXIMISE-μ less seriously than the candidate with both vowel lengthening and gemination (24e) and, thus, becomes optimal in the above tableau. How, then, can we select such a candidate as (24e) as optimal?

When the root-final vowel is not /i/, the domination of ALIGNGEM-L(Modifier), WT-IDENT-IO[+cons] and WT-IDENT-$V_{FIN}$-IO by MAXIMISE-μ makes sure that a candidate with both methods of emphasis is selected as optimal for any adjective. Therefore, we could perhaps extend the concept of 'paradigm uniformity' (Steriade 1999) to solve our problem. Paradigm Uniformity (PU) requires all surface realisations of x, where x is the morpheme shared by the members of paradigm X, to have identical values for property P. In our case at hand, it is not about paradigm uniformity involving just one morpheme but about the uniformity of adjectives as a whole, thus we will need to redefine PU as: a root-final vowel of an adjective must have the identical values for [length] as that of any other adjective when evaluated by the same constraint hierarchy. If we assume that our PU is ranked above MAXIMISE-μ in Tableau (24), then all but the candidate with both vowel lengthening and gemination (24e) will be eliminated by PU before they reach MAXIMISE-μ. This seems to work, but how much support this type of uniform treatment of one part of speech can get from other languages is another issue. Once again, further investigation will be required.

## 9.5 RESIDUAL ISSUE 1 – THE CONSONANTS OF THE *SA-/TA-*COLUMNS

In Chapter 2, 2.2.1, we saw that the consonant of the *sa*-column and that of the *ta*-column alternate between [s] and [ʃ] and between [t], [tʃ] and [ts], respectively. In accordance with general consent among Japanese phonologists,[18] we have assumed in this thesis that the consonants in question are /s/ and /t/ underlyingly regardless of the context. When alternation is observed in verbal paradigms (e.g. /kas+ɯ/ → [kasɯ] 'lend', /kas+i+mas+ɯ/ → [kaʃimasɯ] 'lend (POLITE)'), we should consider that [s]~[ʃ] and [t]~[tʃ]~[ts] are underlying /s/ and /t/, respectively. However, the distribution of [s]~[ʃ] and that of

[18] For discussion on palatalisation/affrication of /s/ and /t/, see Shibatani (1990:163-166).

[t]~[tʃ]~[ts] are complementary in Yamato vocabulary;[19] [s] never occurs directly before [i] and [t] never directly precedes [i] nor [ɯ]. The question arising from here is: do we still have to assume that [ʃi], [tʃi] and [tsɯ] are underlyingly /si/, /ti/ and /tɯ/, respectively, even within a morpheme where no alternation is observed (e.g. [ʃika] 'only', [gatʃi] 'tend to (do)', [gatsɯ] '-th month of the year')? All of /si/ → [ʃi], /ti/ → [tʃi] and /tɯ/ → [tsɯ] violate IDENT-IO(anterior) and/or IDENT-IO(strident) and the latter two violate *COMPLEX as well, while /ʃi/ → [ʃi], /tʃi/ → [tʃi] and /tsɯ/ → [tsɯ] do not incur a violation of any IDENT-IO constraint, thus, in terms of constraint violations, assuming /si/ → [ʃi], /ti/ → [tʃi] and /tɯ/ → [tsɯ] appears to be more costly than assuming /ʃi/ → [ʃi], /tʃi/ → [tʃi] and /tsɯ/ → [tsɯ]. Also, Japanese does have an underlying contrast between /s/ and /ʃ/ (e.g. /sa/ 'difference', /ʃa/ 'company') and between [t] and [tʃ] (e.g. /ta/ 'paddy field', /tʃa/ 'tea') so there does not seem to be any obstacle to stop us from assuming /ʃi/, /tʃi/ and /tsɯ/ for [ʃi], [tʃi] and [tsɯ], respectively.[20] In this subsection, we will look into this aspect and discuss which set of underlying representations is more compatible with our OT analysis.

### 9.5.1 Consonant Alternation in Verbal Paradigms – Morpheme-Final /s/ and /t/

When accounting for consonant alternation in verbal paradigms in Chapter 2, 2.2.1, we did not consider candidates with vowel height being altered (e.g. /kat+i̲+mas+ta/[21] → *[kate̲maʃita] 'won (Polite)') or coronal obstruents being deleted (/kat̲+i+mas̲+ta/ → *[kaimata]). Lowering the vowel height from /i/ to [e] incurs a violation of undominated DEP-IO[-high], and deletion of a coronal obstruent involves another undominated constraint MAX-IO[+obs][cor], thus such candidates as mentioned above should have no chance of beating a candidate with consonant alternation.

[19] In Yamato vocabulary, both [s] and [ʃ] and both [t] and [tʃ] can occur before back vowels (except [t] before [ɯ]), but [s] and [t] can never directly precede [i] while [ʃ] and [tʃ] can never be directly followed by [e].
[20] See Vance (1987:23-33) for a similar argument.
[21] I consider that the past tense morpheme is /ta/ and that /i/ between /mas/ and /ta/ in the polite past form of a verb is epenthetic, just as /i/ between /kas/ and /ta/ in /kas+ta/ → [kaʃita] 'lent', for instance.

(25) Tableau for /kat+i+mas+ta/ 'won (POLITE)'[22]

| Input: /kat+i+mas+ta/ | CODA COND | CV LINK | DEP [-high] | MAX [+obs][cor] | DEP -V | *COMPLX | ID (ant) | ID (str) |
|---|---|---|---|---|---|---|---|---|
| a. ☞ katʃimaʃita | | | | | * | * | ** | * |
| b. katʃimata | | | | *! | | * | * | * |
| c. kaimata | | | | *!* | | | | |
| d. katemaʃita | | | *! | | * | | * | |
| e. katʃimaseta | | | *! | | * | * | * | * |
| f. katemaseta | | | *!* | | * | | | |
| g. katimasita | | *!* | | | * | | | |
| h. katimasta | *! | * | | | | | | |

The above tableau for /kat+i+mas+ta/ 'won (POLITE)' indeed confirms that our constraint ranking opts for the actual candidate [katʃimaʃita] to satisfy undominated constraints at the expense of lower-ranking *COMPLEX and IDENT-IO constraints violations.

### 9.5.2 [ʃi], [tʃi] and [tsɯ] within Morphemes

There are a large number of morphemes whose surface form contains [ʃi], [tʃi] or [tsɯ]. When consonant alternation is not observed, do we still have to consider that their respective underlying representations are /si/, /ti/ and /tɯ/, or should we consider that they are underlyingly /ʃi/, /tʃi/ or /tsɯ/? Let us take [gatʃi] 'tend to (do)' (closed-class item) as an example and draw tableaux for /gati/ and /gatʃi/ to see which underlying representation is more compatible with our OT analysis.

(26) Tableaux for /gati/ and /gatʃi/ 'tend to (do)'

| Input: /gati/ | CV LINKAGE | DEP-IO [-high] | MAX-IO [+obs][cor] | *COMPLEX | IDENT-IO (antetior) | IDENT-IO (strident) |
|---|---|---|---|---|---|---|
| a. ☞ gatʃi | | | | * | * | * |
| b. gai | | | *! | | | |
| c. gate | | *! | | | | |
| d. gati | *! | | | | | |

[22] *[katemaʃita] (25e) merges with /kat+e+mas+ta/ → [katemaʃita] 'could win' but NO-CASUAL-MERGER is irrelevant in Tableau (25) because we are discussing formal speech.

| Input: /gatʃi/ | CV LINKAGE | DEP-IO [-high] | MAX-IO [+obs][cor] | *COMPLEX | IDENT-IO (anterior) | IDENT-IO (strident) |
|---|---|---|---|---|---|---|
| e. ☞ gatʃi | | | | * | | |
| f. gai | | | *! | | | |
| g. gate | | *! | | | * | * |
| h. gati | *! | | | | * | * |

Although /gatʃi/ → [gatʃi] (26e) incurs fewer violation marks than /gati/ → [gatʃi] (26a), neither IDENT-IO(anterior) nor IDENT-IO(strident) has any role to play, as the selection of the optimal candidate is complete within the first stratum of the constraint hierarchy in each case, so that [gatʃi] becomes optimal no matter which underlying representation we postulate. The same applies to /si/ → [ʃi] and /ʃi/ → [ʃi] and to /tɯ/ → [tsɯ] and /tsɯ/ → [tsɯ], as seen in the following tableaux for /sika/~/ʃika/ 'only' and /gatɯ/~/gatsɯ/ '-th month of the year'.

(27) Tableaux for /sika/~/ʃika/ 'only'

| Input: /sika/ | CV LINKAGE | DEP-IO [-high] | MAX-IO [+obs][cor] | IDENT-IO (anterior) |
|---|---|---|---|---|
| a. ☞ ʃika | | | | * |
| b. ika | | | *! | |
| c. seka | | *! | | |
| d. sika | *! | | | |

| Input: /ʃika/ | CV LINKAGE | DEP-IO [-high] | MAX-IO [+obs][cor] | IDENT-IO (anterior) |
|---|---|---|---|---|
| e. ☞ ʃika | | | | |
| f. ika | | | *! | |
| g. seka | | *! | | |
| h. sika | *! | | | * |

(28) Tableau for /gatɯ/~/gatsɯ/ '-th month of the year'[23]

| Input: /gatɯ/ | CV LINK | DEP-IO [-high] | IDENT-IO (cont)[cor] | MAX-IO [+obs][cor] | *COMPLEX | IDENT-IO (strident) |
|---|---|---|---|---|---|---|
| a. ☞ gatsɯ | | | | | * | * |
| b. gaɯ | | | | *! | | |
| c. gasɯ | | | *! | | | * |
| d. gato | | *! | | | | |
| e. gatɯ | *! | | | | | |

| Input: /gatsɯ/ | CV LINK | DEP-IO [-high] | IDENT-IO (cont)[cor] | MAX-IO [+obs][cor] | *COMPLEX | IDENT-IO (strident) |
|---|---|---|---|---|---|---|
| f. ☞ gatsɯ | | | | | * | |
| g. gaɯ | | | | *!* | | |
| h. gasɯ | | | | *! | | |
| i. gato | | *! | | | | * |
| j. gatɯ | *! | | | | | * |

In this subsection we have seen that both /si/ and /ʃi/, both /ti/ and /tʃi/ and both /tɯ/ and /tsɯ/ must surface as [ʃi], [tʃi] and [tsɯ], respectively, due to the interaction of undominated constraints and that, whichever underlying representation we postulate, the actual output is always selected as optimal. Therefore, we can conclude that our OT analysis is compatible with and can accommodate both (i) /si/ → [ʃi], /ti/ → [tʃi] and /tɯ/ → [tsɯ] and (ii) /ʃi/ → [ʃi], /tʃi/ → [tʃi] and /tsɯ/ → [tsɯ].

## 9.6 RESIDUAL ISSUE 2 – VERBAL SUFFIXES

As briefly mentioned in Chapter 6, fn.63, some phonologists (McCawley 1968, Miyara 1980, Fukui 1986, Poser 1986, among others) consider /ɾɯ/ as the only non-past tense morpheme used with a verb root, whether the root is vowel-final or consonant-final, and ascribe non-surfacing of /ɾ/ after a consonant-final verb root to the Continuant Deletion Rule[24] which deletes /ɾ/ following a consonant.

[23] If we consider /ts/ as a single phoneme, (28h) will not violate MAX-IO[+obs][cor] but will violate IDENT-IO (cont)[cor] instead.

[24] /ɾ/, however, is [-cont], thus it is misleading to describe the rule in question as 'Continuant Deletion'.

(29) Continuant Deletion Rule 1

| | /tabe+ɾɯ/ 'eat' | /nom+ɾɯ/ 'drink' |
|---|---|---|
| continuant deletion | n/a | nomɯ |
| | [tabeɾɯ] | [nomɯ] |

In this thesis, following the more widely accepted view, we have considered that the non-past tense morpheme for vowel-final verb roots is /ɾɯ/ and that for consonant-final verb roots is /ɯ/. In fact, we have considered that, except /te/ and /ta/, vowel-final verb roots and consonant-final verb roots never share the same suffix, as seen below.

(30) Verbal paradigms

| | vowel-final /tabe/ 'eat' | consonant-final /nom/ 'drink' | Gloss |
|---|---|---|---|
| a. negative form | tabe+na+i | nom+ana+i | 'not (do)' |
| b. passive form | tabe+ɾaɾe+ɾɯ | nom+aɾe+ɾɯ | 'be (done)' |
| c. causative form | tabe+sase+ɾɯ | nom+ase+ɾɯ | 'let/make (s.o.) (do)' |
| d. polite form | tabe+mas+ɯ | nom+i+mas+ɯ | '(do) (POLITE)' |
| e. dictionary form | tabe+ɾɯ | nom+ɯ | '(do)' |
| f. potential form | tabe+ɾaɾe+ɾɯ | nom+e+ɾɯ | 'can (do)' |
| g. conditional form | tabe+ɾeba | nom+eba | 'if (do)' |
| h. imperative form | tabe+ɾo | nom+e | '(do)!' |
| i. volitional form | tabe+joo | nom+oo | 'let's (do), will (do)' |
| j. past form | tabe+ta | nom+ta | '(did)' |
| k. *te*-form | tabe+te | nom+te | '–ing' |

Even if we assume that there are such rules as 'continuant deletion' (e.g. /sase/ → [ase] (30c), /joo/ → [oo] (30i)) and 'vowel deletion' (/ana/ → [na] (30a)) in verbal inflection, we will still have to postulate two distinct underlying representations for the potential form (/ɾaɾe/ and /e/ or /ɾe/) and the imperative form (/ɾo/ and /e/ or /ɾe/). If the two types of verbs require different suffixes for some forms, why can we not assume that other suffixes are also underlyingly distinct? In this section I will argue that the Continuant Deletion Rule in verbal inflection is not compatible with our OT analysis and that the two types of verbs require phonetically different suffixes for at least the passive, causative, dictionary, potential, conditional, imperative and volitional forms, as exemplified in (30).

### 9.6.1 Vowel Deletion Rule

If we assume that there is only one negative suffix and only one polite suffix, then we will have to consider that they are /ana/ and /i+mas/, respectively. This is because (i) if we assume /na/ as the negative suffix, we will not be able to account for the sudden emergence of /a/ as an epenthetic vowel (the Japanese epenthetic vowel is /i/, as discussed in Chapter 2, 2.3.3) and (ii) if we assume the polite suffix as /mas/, then we will not be able to explain why /i/ is inserted between a /m/-final verb root and the polite suffix in formal speech in spite of the fact that /m/ is a licit coda consonant before /m/ and no violation of CODACOND is incurred (e.g. /nom+mas+ɯ/ → [nomimasɯ]/*[nommasɯ] 'drink (POLITE)').

In order to derive [na] from /ana/ and [mas] from /i+mas/ when /ana/ and /i+mas/ are preceded by a vowel-final verb root, we will need a vowel deletion rule.

(31) Vowel Deletion Rule

| | | |
|---|---|---|
| | /tabe+ana+i/ | /tabe+i+mas+ɯ/ |
| vowel deletion | tabenai | tabemasɯ |
| | [tabenai] | [tabemasɯ] |

This vowel deletion rule is compatible with our OT analysis, whether the preceding verb root belongs to open class or closed class, as seen in the following tableaux for /tabe+ana+i/ 'not eat' (/tabe/: full verb) and /age+ana+i/ 'not do (s.o.) the favour of –ing' (/age/: auxiliary verb when used in this meaning):

(32) Tableaux for /tabe+ana+i/ 'not eat' and /age+ana+i/ 'not do (s.o.) the favour of –ing'[25]

| Input: /tabe+ana+i/ | MAX-IO (Open) | ONSET | MAX-IO (Root) | *e | *a | MAX-V-IO |
|---|---|---|---|---|---|---|
| a. ☞ tabenai | | * | | * | ** | * |
| b. tabeanai | | **! | | * | *** | |
| c. tabanai | *! | * | * | | *** | * |

[25] No avoidance of an ONSET violation by the optimal outputs is due to undominated M-PARSE(tense) and M-PARSE(neg). The minimal requirement to satisfy each of these constraints is the realisation of the morpheme-final vowel.

| Input: /age+ana+i/ | MAX-IO (Open) | ONSET | MAX-IO (Root) | *e | *a | MAX-V-IO |
|---|---|---|---|---|---|---|
| d. ☞ aŋenai | | * | | * | ** | * |
| e. aŋeanai | | **! | | * | *** | |
| f. aŋanai | | * | *! | | *** | * |

The domination of the *V subhierarchy by MAX-IO(Open) and MAX-IO(Root) makes sure that the vowel to be deleted is the one belonging to the suffix, not the one belonging to the root. So far, assuming uniform suffixes for both types of verb roots seems to work. Let us next examine the Continuant Deletion Rule in verbal inflection to see if that is still the case.

### 9.6.2 Continuant Deletion Rule

If we assume that both vowel-final verb roots and consonant-final verb roots require the same suffix for a certain form, we will expect that the passive, causative, dictionary, conditional and volitional morphemes are /ɾaɾe/, /sase/, /ɾɯ/, /ɾeba/ and /joo/, respectively, and that the Continuant Deletion Rule will delete the initial consonant from each of these morphemes when directly preceded by a consonant-final verb root.

(33) Continuant Deletion Rule 2[26]

| | | | |
|---|---|---|---|
| | /nom+ɾaɾe+ɾɯ/ | /nom+sase+ɾɯ/ | /nom+joo/ |
| continuant deletion | nomaɾeɾɯ | nomaseɾɯ | nomoo |
| OCP | n/a | n/a | nomo: |
| | [nomaɾeɾɯ] | [nomaseɾɯ] | [nomo:] |

They all seem to work well in a derivational theoretical analysis, but in an OT analysis the deletion of the suffix-initial consonants does pose a problem, as seen in the following tableaux:

[26] The dictionary form (/nom+ɾɯ/ → [nomɯ]) and the conditional form (/nom+reba/→ [nomeba]) are omitted in order to save space.

(34) Tableau for /nom+ɾaɾe+ɾɯ/ ‘be drunk’

| Input: /nom+ɾaɾe+ɾɯ/ | CODA COND | IDENT-ONS (place) | MAX (Open) | MAX INIT-C | *LAB | MAX (Root) | MAX FIN-C | *ɾ |
|---|---|---|---|---|---|---|---|---|
| a. nomaɾeɾɯ | | | | * | *! | | | ** |
| b. ☹ noɾaɾeɾɯ | | | * | | | * | * | *** |
| c. nonaɾeɾɯ | | *! | | * | | | | ** |
| d. nomɾaɾeɾɯ | *! | | | | * | | | *** |

(35) Tableau for /nom+sase+ɾɯ/ ‘let/make (s.o.) drink’

| Input: /nom+sase+ɾɯ/ | CODA COND | MAX[+obs] [cor] | IDENT-ONS (place) | MAX (Open) | MAX INIT-C | *LAB |
|---|---|---|---|---|---|---|
| a. nomaseɾɯ | | *! | | | * | * |
| b. ☹ nosaseɾɯ | | | | * | | |
| c. nonaseɾɯ | | *! | * | | * | |
| d. nomsaseɾɯ | *! | | | | | * |

(36) Tableau for /nom+joo/ ‘let’s drink, will drink’[27]

| Input: /nom+joo/ | CODA COND | IDENT-ONS (place) | MAX (Open) | MAX INIT-C | *LAB | MAX (Root) | MAX FIN-C |
|---|---|---|---|---|---|---|---|
| a. nomo: | | | | *! | * | | |
| b. nojo: | | | *! | | | * | * |
| c. ☹ nomʲo: | | | | | * | | |
| d. nonʲo: | | *! | | | | | |
| e. nomjo: | *! | | | | * | | |

In all three tableaux the actual outputs are beaten by the candidates with no deletion of the suffix-initial consonant.[28] The problem with the above tableaux lies in the assumption that consonant-final verb roots require the same suffix as vowel-final verb roots for each form. Let us replace the underlying representations with /nom+aɾe+ɾɯ/, /nom+ase+ɾɯ/ and /nom+oo/ and redraw the tableaux to confirm that the actual outputs are correctly selected as optimal in each case this time.

[27] Candidates that violate high-ranking OCP(IdentV), such as *[nomoo], are omitted from the tableau.

[28] In the case of the passive form (34), the dictionary form and the conditional form, when the root does not end in a labial, the actual output will be selected as optimal.

(37) Tableau for /nom+are+ɾɯ/ ‘be drunk’[29]

| Input: /nom+are+ɾɯ/ | CODA COND | IDENT-ONS (place) | MAX (Open) | MAX $_{\text{INIT}}$-C | *LAB | MAX (Root) | MAX $_{\text{FIN}}$-C | *ɾ |
|---|---|---|---|---|---|---|---|---|
| a. ☞ nomareɾɯ | | | | | * | | | ** |
| b. noɾareɾɯ | | *! | * | | | * | * | *** |
| c. nonareɾɯ | | *! | | | | | | ** |
| d. nomɾareɾɯ | *! | | | | * | | | *** |

(38) Tableau for /nom+ase+ɾɯ/ ‘let/make (s.o.) drink’[30]

| Input: /nom+ase+ɾɯ/ | CODA COND | MAX[+obs] [cor] | IDENT-ONS (place) | MAX (Open) | MAX $_{\text{INIT}}$-C | *LAB |
|---|---|---|---|---|---|---|
| a. ☞ nomaseɾɯ | | | | | | * |
| b. nosaseɾɯ | | | *! | * | | |
| c. nonaseɾɯ | | | *! | | | |
| d. nomsaseɾɯ | *! | | | | | |

(39) Tableau for /nom+oo/ ‘let’s drink, will drink’[31]

| Input: /nom+oo/ | CODA COND | IDENT-ONS (place) | MAX (Open) | MAX $_{\text{INIT}}$-C | *LAB | MAX (Root) | MAX $_{\text{FIN}}$-C | DEP |
|---|---|---|---|---|---|---|---|---|
| a. ☞ nomo: | | | | | * | | | |
| b. nojo: | | *! | * | | | * | * | * |
| c. nom$^{j}$o: | | | | | * | | | *! |
| d. non$^{j}$o: | | *! | | | | | | * |
| e. nomjo: | *! | | | | * | | | * |

In this section I have shown that the Continuant Deletion Rule is not compatible with our OT analysis. We should, therefore, consider that, except for the past form and the *te*-form, all the verbal suffixes for consonant-final verb roots lack an initial consonant, just as we have assumed throughout this thesis. As for the negative form and the polite form of vowel-final root verbs, I consider that their respective suffixes are /na/ and /mas/, based on one of the OT principles, ‘Lexicon Optimisation’.

[29] If we consider that [ɾ] corresponds to /m/, then (37b) will not violate MAX-IO(Open), MAX-IO(Root) or MAX$_{\text{FIN}}$-C-IO.

[30] If we consider that [s] corresponds to /m/, then (38b) will not violate MAX-IO(Open).

[31] If we consider that [j] corresponds to /m/, then (39b) will not violate MAX-IO(Open), MAX-IO(Root), MAX$_{\text{FIN}}$-C-IO or DEP-IO.

## 9.7 CONCLUSION

This thesis has been an attempt to formalise the grammar underlying casual speech of Japanese by means of constraint reranking within the framework of Optimality Theory. To this end, the constraint hierarchy for formal Japanese speech was established first and, through the analysis of a variety of phonological processes observed in the register of casual speech, it was confirmed that the shift from formal speech to casual speech involves the demotion of only two high-ranking MAXIMALITY family constraints, namely, MAX-V-IO and MAX-C-IO, and that casual speech reduction can mostly be ascribed to the interaction of ONSET, *LAB and *ɾ, below which MAX-V-IO and MAX-C-IO are now ranked.

In Japanese, open-class items are considered to be more privileged than closed-class items and, consequently, there are a number of constraints that require faithful realisation of open-class items, such as MAX-IO(Open) and IDENT-IO(height)(Open), as well as those that force open-class items to start and end at syllable edges (i.e. ALIGN-L(Open), ALIGN-R (Open)). Because of these class-specific constraints, open-class items are protected from deviation and only closed-class items are targeted by most of the phonological processes in casual speech. The distinction between open class and closed class, therefore, is a cornerstone of the formal-casual contrast in Japanese phonology.

In addition to reduction, deliberate unfaithful phonetic realisation is often observed in casual speech. This deformation is a method of expressing some kind of connotation that is not part of lexical representations, and it involves inverse CL, vowel coalescence, or gemination, prenasalisation and/or vowel lengthening. In order to account for it, we assumed that there are three anti-faithfulness constraints, ¬WT-IDENT-IO for inverse CL, ¬IDENT$_{FIN}$-IO[+back](Root) for vulgarisms, and ¬WT-IDENT-IO(Modifier) for emphatic expressions, which are ranked way down low under ordinary circumstances but are upgraded to affect the configuration of the surface form only when the speaker wishes to express 'friendliness, cuteness, childishness' (inverse CL), 'roughness' (vulgarisms) or 'emotional emphasis' (emphatic expressions).

The phonological processes we have dealt with are by no means comprehensive and there are many more that have been excluded from this thesis for lack of space: vowel devoicing (e.g. /asita/ → [aʃi̥ta] 'tomorrow'), reduction of compound verbs (e.g.

/joɾ+i#kakaɾ+ɯ/ → [jokkakaɾɯ] 'lean') and word clipping (e.g. /gakɯ+sei#waɾ+i# hik+i/ → [gakɯwaɾi] 'student discount'), just to name a few. It will be necessary to account for all these processes as well by way of constraint interaction in order to make our OT analysis of casual Japanese speech more complete. This remains for future work.

# APPENDICES

## 1 Source of Data for the Survey in 1993-1994

Everyday conversations – a family in Tokyo at a dinner table (40 minutes), a family in Nagoya playing games (45 minutes); conference reports (120 minutes); lectures (240 minutes); TV dramas/movies – *Chûgakusei Nikki*: *Jukensei Rondo* (NHK: 30 minutes), *Chûgakusei Nikki*: *Seishun no Blue Jeans* (NHK: 30 minutes), *Meitantei Powaro*: *Kurabu no Kingu* (NHK: 25 minutes), *Bakayarô 2*: *Shiawase ni Naritai* (80 minutes), *Magokoro o Kimi ni* (90 minutes); Animations – *Chibi Maruko-chan* (Fuji TV: 60 minutes), *Sazae-san* (Fuji TV: 30 minutes), *Doraemon* (TBS: 45 minutes), *Majo no Takkyûbin* (90 minutes); TV variety shows – *Hirudoki Nippon* (NHK: 25 minutes), *Shinshun Yuttari Kikô* (TV Tokyo: 45 minutes), *Ii Tabi Yume Kibun* (TV Tokyo: 45 minutes); TV language programmes – *Practical Nihongo Kôza* (NHK: 30 minutes), *Eikaiwa I* (NHK: 25 minutes); TV interviews – *Kotoba wa Kawaru*: *Watashi no Nihongo* (NHK: 25 minutes), *Shinshun Tôshu Interview* (NHK: 120 minutes); TV news programmes – *NHK News 9* (NHK: 30 minutes), *News Digest Tokai* (NHK: 10 minutes), *News Station* (TBS: 65 minutes); TV documentaries – *Shin Nihon Tanbô* (NHK: 100 minutes), *Teshigoto Nippon* (NHK: 30 minutes), *Nihon Bi Sai Hakken* (NHK: 90 minutes), *Yakushima*: *Genseirin no Shiki* (NHK: 20 minutes), *Ôu Sanmyaku no Shiki* (NHK: 20 minutes), *Yomigaere Nihon no Mori* (TV Asahi: 10 minutes); TV sports programmes – *Daigaku Ekiden* (Yomiuri TV: 30 minutes), *Rugby* (TV Tokyo: 30 minutes); radio talk shows – *Yoshida Takurô & Komuro Hitoshi Talk Session* (FM Aichi: 30 minutes), *Mami no Radical* (Tokai Radio: 30 minutes), *Gaikokugo Sekai e no Izanai* (NHK: 30 minutes); radio music programme – *Sound in Oasis* (FM Aichi: 20 minutes): radio sports programme – *Soccer League Championship* (Tokai Radio: 30 minutes); Comic Magazines – *Big Comic Original January 20th 1994* (Shôgakkan), *Manga Time February 1994* (Hôbunsha); movie subtitles – *Sei Naru Yopparai no Densetsu*, *Nyû Shinema Paradaisu*; dictionary – *Shin Meikai Kokugo Jiten* (Sanseidô 1991). (The data were collected for my 1995 unpublished MA thesis.)

## 2 Survey in 2001

Purpose: to check a speech shift between formal and casual as well as to gather data on phonological processes observed in casual speech in Japanese.

Method: to have subjects (all of whom were strangers to me) chat with someone close to them for approximately 10 minutes then summarise the chat to me. Both the chat and the summary were recorded on tape.

Number of subjects: nine - six males and three females with the age ranging from 11 to mid 50's. The subjects were notified of the purpose and method of the survey in writing before they agreed to participate in the survey.

This survey was pre-approved by Human Ethics Committee, University of Canterbury, on 5 October 2001.

## 3 Moraic Sounds in Japanese

| Vowel | /k/ | /g/ | /s/ | /z/ | /t/ | /d/ | /n/ | /h/ | /p/ | /b/ | /m/ | /j/ | /ɾ/ | /w/ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| /a/ | ka | ga | sa | za | ta | da | na | ha | pa | ba | ma | ja | ɾa | wa |
| /i/ | ki | gi | ʃi | dʒi | tʃi | dʒi | ni | çi | pi | bi | mi | | ɾi | |
| /ɯ/ | kɯ | gɯ | sɯ | dzɯ | tsɯ | dzɯ | nɯ | ɸɯ | pɯ | bɯ | mɯ | jɯ | ɾɯ | |
| /e/ | ke | ge | se | ze | te | de | ne | he | pe | be | me | | ɾe | |
| /o/ | ko | go | so | zo | to | do | no | ho | po | bo | mo | jo | ɾo | |
| Pal. | kʲa | gʲa | ʃa | dʒa | tʃa | dʒa | ɲa | ça | pʲa | bʲa | mʲa | | ɾʲa | |
| | kʲɯ | gʲɯ | ʃɯ | dʒɯ | tʃɯ | dʒɯ | ɲɯ | çɯ | pʲɯ | bʲɯ | mʲɯ | | ɾʲɯ | |
| | kʲo | gʲo | ʃo | dʒo | tʃo | dʒo | ɲo | ço | pʲo | bʲo | mʲo | | ɾʲo | |

NB: In addition to the above moraic sounds, the second half of a long vowel, the first half of a geminate and a moraic nasal are monomoraic.

## 4 Existing and Nonsense Adjectives Used for the Survey in 2002-2003

### i. Existing words

a. Disyllabic roots

/aka/ 'red', /ama/ 'sweet', /ao/ 'blue', /hɯɾɯ/ 'old', /ita/ 'sore, painful', /jaba/ 'risky, unwise', /jasɯ/ 'cheap', /kaɾa/ 'spicy', /kajɯ/ 'itchy', /kowa/ 'scary, scared', /kɯdo/ 'tedious, importunate', /maɾɯ/ 'round', /mazɯ/ 'tasteless, yucky', /naga/ 'long', /sɯgo/ 'terrific, terrible'; /ki+iɾo/ 'yellow', /ooki/ 'big', /tiisa/ 'small'

b. Trisyllabic roots

/abɯna/ 'dangerous', /akaɾɯ/ 'light, bright', /akɯdo/ 'vicious', /hagajɯ/ 'impatient, irritated', /hagesi/ 'violent, fervent, severe', /jasasi/ 'kind, easy', /kawai/ 'cute, pretty', /kitana/ 'dirty', /kiwado/ 'hair-breadth, close', /kɯjasi/ 'vexed, vexing', /mabajɯ/ 'dazzling, radiant', /minikɯ/ 'ugly', /mizika/ 'short', /oisi/ 'delicious', /okasi/ 'strange, funny', /osana/ 'childish, very young', /sabisi/ 'lonely', /si+kakɯ/ 'square', /sitasi/ 'familiar, intimate', /sɯɾɯdo/ 'sharp, keen', /tanosi/ 'happy, enjoyable', /tɯmeta/ 'cold', /tɯɾena/ 'heartless', /ɯɾesi/ 'glad', /kattaɾɯ/ 'languid, dull'

c. Quadrisyllabic roots

/aɾ+i+gata/ 'gracious', /ataɾasi/ 'new', /azi+ke+na/ 'dreary', /isogasi/ 'busy', /ijaɾasi/ 'indecent', /jakamasi/ 'noisy, loud', /jawaɾaka/ 'soft', /kɯdaɾana/ 'trivial, worthless', /mezɯɾasi/ 'unusual, rare', /mɯzɯkasi/ 'difficult, hard', /nama+nɯɾɯ/ 'lukewarm', /omosiɾo/ 'interesting, amusing', /tanomosi/ 'reliable', /tɯmaɾana/ 'boring, bored', /ɯtɯkɯsi/ 'beautiful'; /madaɾɯ+kko/ 'sluggish', /mottaina/ 'wasteful', /sɯbasi+kko/ 'nimble, quick', /wasɯɾe+ppo/ 'forgetful'

**ii. Nonsense words**

a. Trisyllabic roots
/asokɯ/ – /kokɯso/, /hadosɯ/ – /kisɯdo/, /honajɯ/ – /mojɯna/; /mabɯza/ – /tozabɯ/ (Section C); /hojaɾɯ/ – /miɾajo/, /jamoɾo/ – /koɾomo/; /keɾezɯ/ – /noɾɯze/ (Section D)

b. Quadrisyllabic roots
/atasaɾi/ – /eɾiseta/ – /isotiɾo/ – /oɾotosi/ – /ɯsaɾeto/ – /ɯtaɾosi/, /kaɾinobi/ – /kebineɾɯ/ – /kibenoɾa/ – /kinaboɾo/ – /koniɾabɯ/ – /kɯɾebanɯ/

## 5 Constraints

**i. Faithfulness constraints**

a. **ANCHOR-IO(Open)**: No deletion/insertion of segments at edges of an open-class item.
b. **CONTIG-IO(Open)**: No medial insertion or deletion of segments within an open-class item.
c. **DEP-IO**: No insertion of segments (McCarthy & Prince 1995).
d. **DEP-V-IO**: No insertion of vowels.
e. **DEP-IO[+back]**: No insertion of [+back].
f. **DEP-IO[-back]**: No insertion of [-back].
g. **DEP-IO[-high]**: No insertion of [-high].
h. **MAX-IO**: No deletion of segments (McCarthy & Prince 1995).
i. **MAX-C-IO**: No deletion of consonants (Kager 1999).
j. **MAX-V-IO**: No deletion of vowels (Kager 1999).
k. **MAX$_{\text{INIT}}$-C-IO**: No deletion of the leftmost consonant of a morpheme (Kawai 2003a, 2003b).
l. **MAX$_{\text{FIN}}$-C-IO**: No deletion of the rightmost consonant of a morpheme (Kawai 2003b).
m. **MAX-IO(Float)**: No deletion of floating features.
n. **MAX-IO(Open)**: No deletion of segments from open-class items (Kawai 2003a, 2003b).
o. **MAX-IO(Root)**: No deletion of segments from roots (Kawai 2003b).
p. **MAX-IO[+obs][cor]**: No deletion of coronal obstruents.
q. **M-PARSE(neg)**: Negative morphemes must be parsed.
r. **M-PARSE(potential)**: Potential morphemes must be parsed.
s. **M-PARSE(tense)**: Tense morphemes must be parsed.
t. **IDENT-IO(anterior)**: No change in the values for [anterior].
u. **IDENT-IO(back)**: No change in the values for [back] (Kager 1999).
v. **IDENT-IO(continuant)**: No change in the values for [continuant].
w. **IDENT-IO(cont)[cor]**: Corresponding coronal segments must have the same value for [cont].
x. **IDENT-IO(height)(Closed)**: No change in the values for height in closed-class items.
y. **IDENT-IO(height)(Open)**: No change in the values for height in open-class items.

z. **IDENT-IO(lateral)**: No change in the values for [lateral] (Lee 2003).
aa. **IDENT-IO(nasal)**: No change in the values for [nasal] (McCarthy & Prince 1995).
bb. **IDENT-IO(place)**: No change in the place of articulation (Kager 1999).
cc. **IDENT-IO(strident)**: No change in the values for [strident].
dd. **IDENT-IO(voice)**: No change in the values for [voice] (McCarthy & Prince 1995).
ee. **IDENT-IO[+ObsVoice]**: An output correspondent obstruent of a [+voice] input obstruent must be [+voice].
ff. **IDENT-IO[+voice]**: An output correspondent of a [+voice] input segment must be [+voice] (Itô & Mester 1998).
gg. **IDENT-IO[-voice]**: An output correspondent of a [-voice] input segment must be [-voice] (Itô & Mester 1998).
hh. **IDENT-LONGV$_{\mathrm{INIT}}$-IO(Open)**: In open class an output long vowel and the first member of its corresponding input vowel sequence must have identical features except for length.
ii. **IDENT-ONSET-IO(nasal)**: No change in the values for [nasal] of an onset.
jj. **IDENT-ONSET-IO(place)**: No change in the place of articulation of an onset (Beckman 1998).
kk. **¬IDENT$_{\mathrm{FIN}}$-IO[+back](Root)**: It is not the case that the root-final [+back] segment and its output correspondent agree in the values for [back].
ll. **NO-PARSE-μ(DelSeg)**: Moras carried by deleted segments must not be parsed.
mm. **REALISE-MORPHEME**: Every morpheme in the input has a nonnull phonological exponent in the output (Itô & Mester 1998, 2003).
nn. **PARSE-μ**: Moras must be parsed (McCarthy & Prince 1993a).
oo. **UNIFORMITY-IO**: No coalescence (McCarthy & Prince 1995).
pp. **WT-IDENT-IO**: No lengthening or shortening of segments (McCarthy 1995).
qq. **WT-IDENT-IO(Open)**: No lengthening or shortening of segments in open-class items.
rr. **WT-IDENT-IO[+cons]**: No lengthening or shortening of [+cons] segments.
ss. **WT-IDENT-IO[+continuant]**: No lengthening or shortening of continuants.
tt. **WT-IDENT-IO[+nasal]**: No lengthening or shortening of nasals.
uu. **WT-IDENT-IO[+sonorant]**: No lengthening or shortening of sonorants.
vv. **WT-IDENT-V$_{\mathrm{INIT}}$-IO**: No lengthening or shortening of a vowel in a morpheme-initial syllable.
ww. **WT-IDENT-V$_{\mathrm{MID}}$-IO**: No lengthening or shortening of a vowel in a morpheme-medial syllable.
xx. **WT-IDENT-V$_{\mathrm{FIN}}$-IO**: No lengthening or shortening of a vowel of a morpheme-final syllable.
yy. **WT-IDENT-WD$_{\mathrm{FIN}}$-IO(Open)**: No lengthening or shortening of a word-final segment in open-class items.
zz. **¬WT-IDENT-IO**: It is not the case that corresponding segments agree in weight.
A. **¬WT-IDENT-IO(Modifier)**: It is not the case that corresponding segments in a modifier agree in weight.

**ii. Featural markedness constraints**

a. **CODACOND**: A syllable-final consonant is placeless (Itô 1986, McCarthy & Prince 1986).
b. **CVLINKAGE(I)**: Coronal obstruents are palatalised before a high front vowel (Itô & Mester 1995b).
c. **CVLINKAGE(*TU)**: Coronal stops are affricated before a high back vowel (Itô & Mester 1995b).
d. **CVLINKAGE(*HI)**: Glottal fricatives are palatalised before a high front vowel.
e. **CVLINKAGE(*HU)**: Glottal fricatives are labialised before a high back vowel.
f. **NOVOIGEM**: No voiced geminates (Itô & Mester 1995b).
**OCP(IdentV)**: A sequence of two identical vowels is disallowed.
g. **VOP**: Voiced obstruents are disallowed (Itô & Mester 1998).
h. **VOP$^{2}_{\text{STEM}}$**: No double occurrence of voiced obstruency in a stem (Itô & Mester 1998).
i. ***LAB**: No labials (Smolensky 1993).
j. ***NÇ**: No nasal-voiceless obstruent sequence (Pater 1999).
k. ***STRUC**: No structure (Prince & Smolensky 1993).
l. ***a**: No [a].
m. ***e**: No [e].
n. ***g**: Voiced dorsal obstruents are prohibited (McCarthy & Prince 1995, Itô & Mester 1997).
o. ***i**: No [i].
p. ***o**: No [o].
q. ***ɯ**: No [ɯ].
r. ***Nɾ**: [ɾ] is prohibited after a nasal.
s. ***[ŋ**: [ŋ] is prohibited word-initially (McCarthy & Prince 1995, Itô & Mester 1997).
t. ***ɾ**: No flaps (McCarthy & Prince 1995).
u. ***[ɾ**: [ɾ] is prohibited word-initially.
v. ***VbV(Closed)**: No intervocalic [b] in closed-class items.
w. ***wV[-low]**: no velar glide before a non-low vowel (Kawai 2003a, 2003b).

**iii. Prosodic markedness constraints**

a. **GRWD>ROOT(Open)**: In open class a grammatical word must have at least one more mora than its root projects.
b. **NUCLEUS**: Syllables must have a vowel (Prince & Smolensky 1993).
c. **ONSET**: Syllables must have onsets (Itô 1986, 1989).
d. ***COMPLEX**: Syllables have at most one consonant at an edge (Prince & Smolensky 1993).
e. ***DIPHTHONG**: Diphthongs are disallowed.
f. ***3μ**: Trimoraic syllables are disallowed (Kager 1999).
g. ***3μ(Modifier)**: Trimoraic syllables are disallowed in modifiers.

**iv. Alignment constraints**

a. **ALIGN-L(Open)**: The left edge of an open-class item must coincide with the left edge of a syllable.

b. **ALIGN-L(CaseParticle)**: The left edge of a case particle must coincide with the left edge of a syllable.

c. **ALIGN-R(Open)**: The right edge of an open-class item must coincide with the right edge of a syllable.

d. **ALIGN-SFX[2]**: No deletion or insertion of more than one segment at a boundary between a root and a suffix.

e. **ALIGNGEM-L(Modifier)**: In a modifier the left edge of a geminate must coincide with the leftmost consonant.

**v. Others**

a. **NO-CASUAL-MERGER**: For $S_1$ and $S_2$ that belong to the same part of speech, if $S_1 \neq S_2$ in formal speech, then $S_1 \neq S_2$ in casual speech.

b. **MAXIMISE-μ**: Maximise the number of moras.

c. **MAXIMISE-μ(Modifier)**: Maximise the number of moras in a modifier.

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